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M E M O R A N D U M

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: March 29, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A cold front will push southward into the northern part of the SFWMD Wednesday mid-morning and the southern half of the area Wednesday afternoon. A good or widespread coverage of rainfall is forecast from around Lake Okeechobee and the western interior through the lower and middle east coasts of the SFWMD, with cooler and drier weather settling in behind the front. The showers and thunderstorms will probably concentrate closer to the east coast, with a few of the storms potentially becoming severe. The rains should then diminish before sunset as the front pushes southward into the Florida Keys. Cooler and breezy conditions will prevail behind the front, along with mainly dry conditions across the SFWMD. However, just enough residual moisture and heating over the western half of the SFWMD could result in widely scattered shower activity, especially along and near the west coast of the SFWMD through the Everglades late in the afternoon. A slow warming trend will begin Friday with dry conditions likely area wide. The heat will return across the SFWMD on Saturday, especially over the interior, with dry weather most likely continuing. A second cold front should either stall over north Florida or push southward into the SFWMD on Sunday. Currently, there is more model support for the frontal boundary pushing into the SFWMD, which would result in an increase of rains Sunday and perhaps again on Monday. However, the early week forecast next week is rated of low confidence. For the week ending next Tuesday morning, total SFWMD rainfall is most likely to be near-normal. However, area-averaged rainfall south of Lake Okeechobee is forecast to be near or above normal, except along and near the west coast, while the driest conditions are likely over the far northern part of the SFWMD.

Kissimmee

Releases were made from East Lake Toho and Lake Toho to continue their recessions to their respective low pools on June 1. Weekly average discharges on March 26, 2023, at S-65 and S-65A were 660 cfs and 600 cfs, respectively. Mean weekly water depth on the Kissimmee River floodplain of 0.16 ft was the same as last week. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.0 mg/L last week to 7.0 mg/L for the week ending March 26, 2023, above both the potentially lethal

level and the physiologically stressful range for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 14.71 feet NGVD on March 26, 2023, with water levels 0.87 feet lower than a month ago. Lake stage was 0.21 feet above the upper limit of the ecological envelope. Average daily inflows (excluding rainfall) were similar to the previous week, going from 625 cfs to 551 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week, going from 3,203 cfs to 4,576 cfs. March water quality data revealed none of the 30 sites that were sampled had chlorophyll a value greater than 40 µg/L and only one site had detectible toxin levels. Recent satellite imagery (March 26, 2023) showed a low to moderate bloom potential in Fisheating Bay and a few scattered areas of low to moderate bloom potential in the northern pelagic regions.

Estuaries

Total inflow to the St. Lucie Estuary averaged 357 cfs over the past week with 275 cfs coming from Lake Okeechobee. Mean salinities decreased at all sites in the estuary over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,002 cfs over the past week with 1,941 cfs coming from Lake Okeechobee. Mean surface salinities remained the same at S-79, Val I-75 and Sanibel, increased at Shell Point, and decreased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral (10-25) and in the upper stressed range at Shell Point and Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, March 26, 2023, 1,700 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 39,600 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 1,024,000 ac-feet. Most STA cells are at or near target stage, except STA-5/6 where most cells are below target. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. STA-1E Eastern Flow-way contains nests of Migratory Bird Treaty Act protected species. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Rates of stage change within the EPA slowed last week, with some regions in the “good” range over the last week. Depths are returning to average in WCA-3A northeast (and remain one of the shallowest regions in the WCAs). Depths are below ground in WCA-3A

northwest and continue to fall quickly but slowed last week. Wading birds continue nesting across the EPA. Nesting and foraging continue in WCA-1. White ibis (WHIB) are nesting at Alley North in large numbers (8K). Wood storks (WOST) are nesting at the Jetport and downstream in the ENP coastal colonies, however dry conditions lower the chance of successful nesting. Once again Taylor slough stages fell at all gauges last week but at a slower rate than the week prior. Average salinity increased again last week in Florida Bay and the central and eastern region remain near the 75th percentile.

Biscayne Bay

Total inflow to Biscayne Bay averaged 252 cfs and the previous 30-day mean inflow averaged 235 cfs. The seven-day mean salinity was 32.0 at BBCW8 and 28.3 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On March 26, 2023, mean daily lake stages were 56.2 feet NGVD (1.4 feet below schedule) in East Lake Toho, 53.2 feet NGVD (1.4 feet below schedule) in Lake Toho, and 50.3 feet NGVD (1.5 feet below the approved temporary deviation schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending March 26, 2023, mean weekly discharge was 660 cfs at S-65 and 600 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 530 cfs at S-65D and 530 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 28.4 feet NGVD at S-65D on March 26, 2023. Mean weekly river channel stage of 34.7 ft NGVD on March 26, 2023, was 0.1 foot lower than the previous week's mean (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain of 0.16 ft for the week ending March 26, 2023, was the same as the previous week's mean (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.0 mg/L the previous week to 7.0 mg/L for the week ending March 26, 2023 (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Continue stage recessions in Lake Toho and East Lake Toho to their June 1 low pools. If needed, reduce discharge at S-65A by up to 38 cfs/day until discharge is decreased to 300 cfs.

Table KB-1. Average discharge for the preceding seven days, Sunday’s average daily stage and Sunday’s average daily departure from KCOL flood regulation lines or temporary schedules. All data are provisional.

Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) ^a	Schedule Type ^b	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							3/26/23	3/19/23
Lakes Hart and Mary Jane	S-62	LKMJ	0	60.4	R	60.8	-0.4	-0.5
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.4	R	60.7	-0.3	-0.3
Alligator Chain	S-60	ALLI	0	0.0	R	63.7	-63.7	-0.2
Lake Gentry	S-63	LKGT	9	61.2	R	61.2	0.0	-0.1
East Lake Toho	S-59	TOHOE	0	56.2	R	57.6	-1.4	-1.6
Lake Toho	S-61	TOHOW S-61	36	53.2	R	54.6	-1.4	-1.6
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	660	50.3	T	51.8	-1.5	-0.4

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.

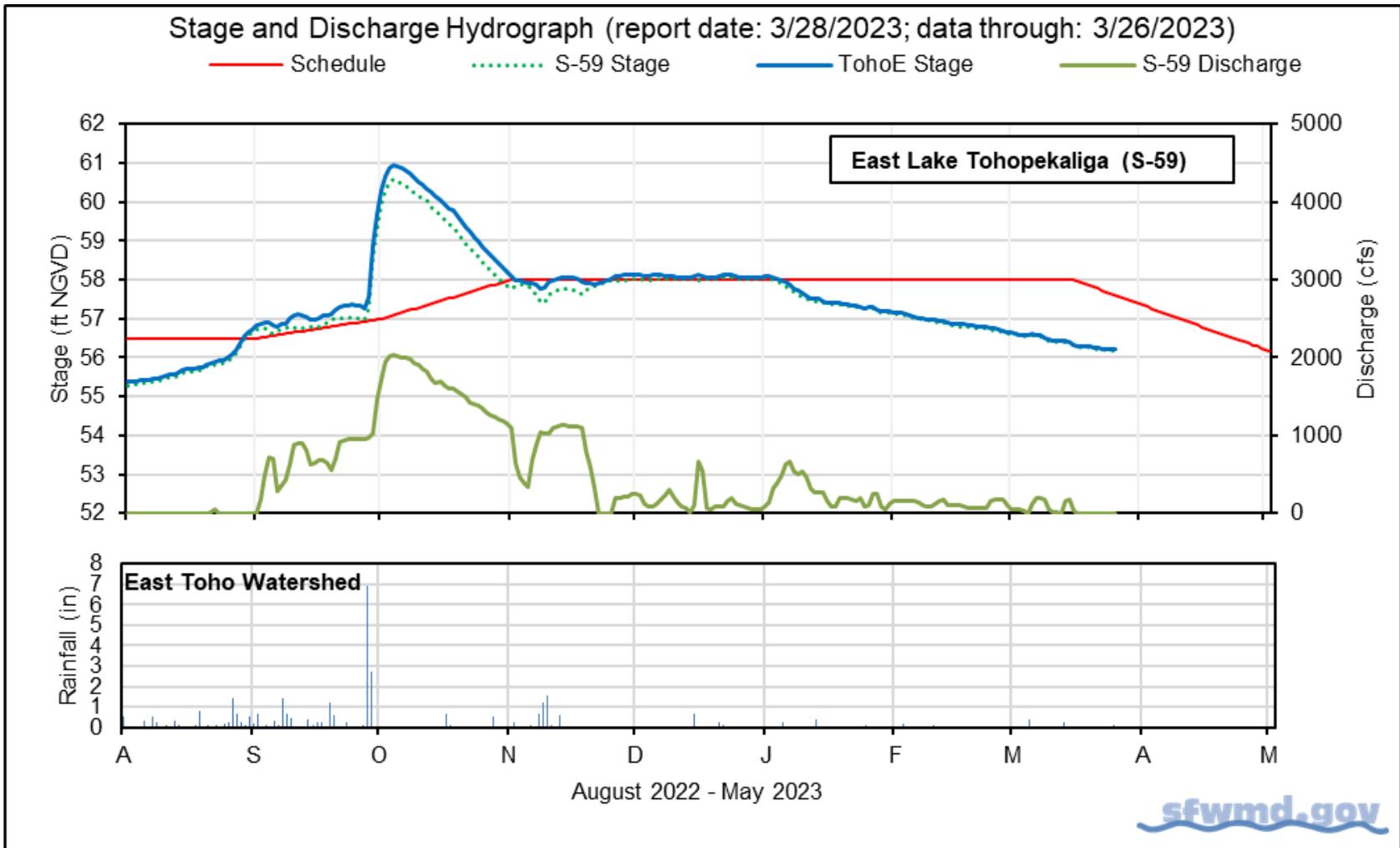


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

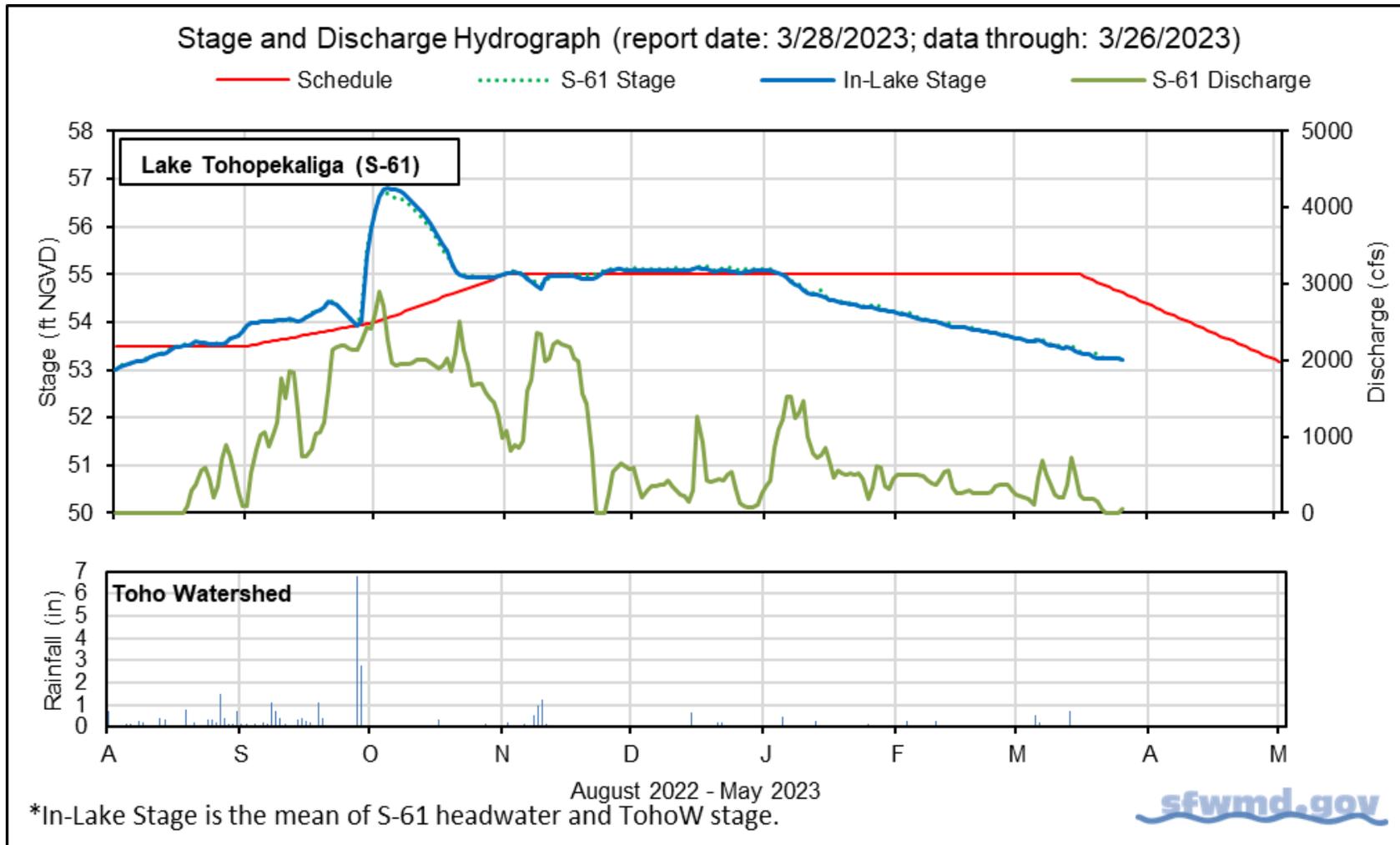


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

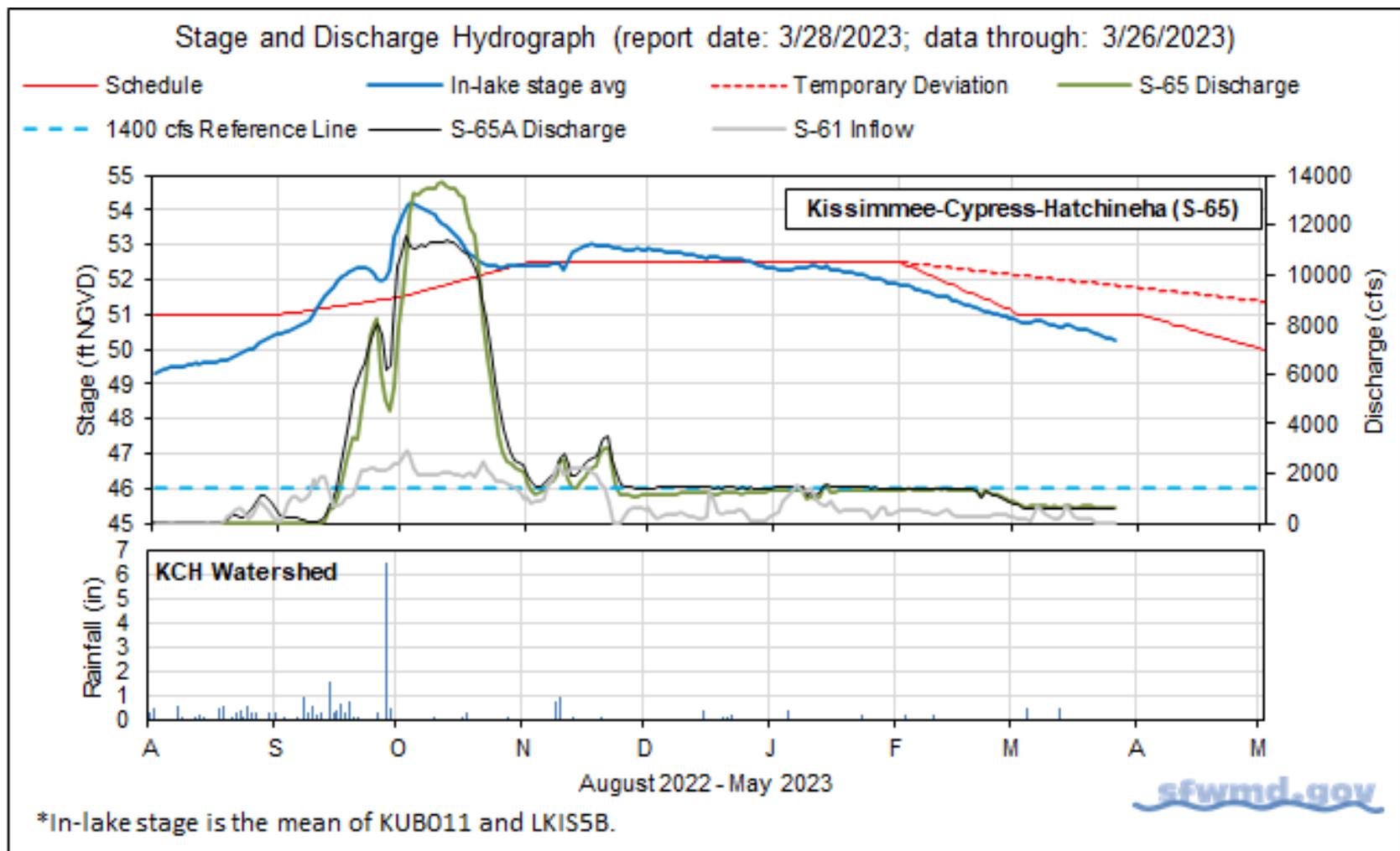


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Table KB-2. One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Sunday Daily Average	Weekly Average for Previous Seven Day Periods			
		3/26/23	3/26/23	3/19/23	3/12/23	3/5/23
Discharge	S-65	660	660	670	680	790
Discharge	S-65A ^a	590	600	610	620	740
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.4	46.3	46.3
Discharge	S-65D ^b	530	530	580	630	1,000
Headwater Stage (feet NGVD)	S-65D ^c	28.4	28.4	28.3	28.4	28.4
Discharge (cfs)	S-65E ^d	520	530	570	670	1,000
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	6.9	7.0	6.0	5.4	5.3
River channel mean stage ^f	Phase I river channel	34.7	34.7	34.8	35.0	36.1
Mean depth (feet) ^g	Phase I floodplain	0.15	0.16	0.16	0.14	0.28

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

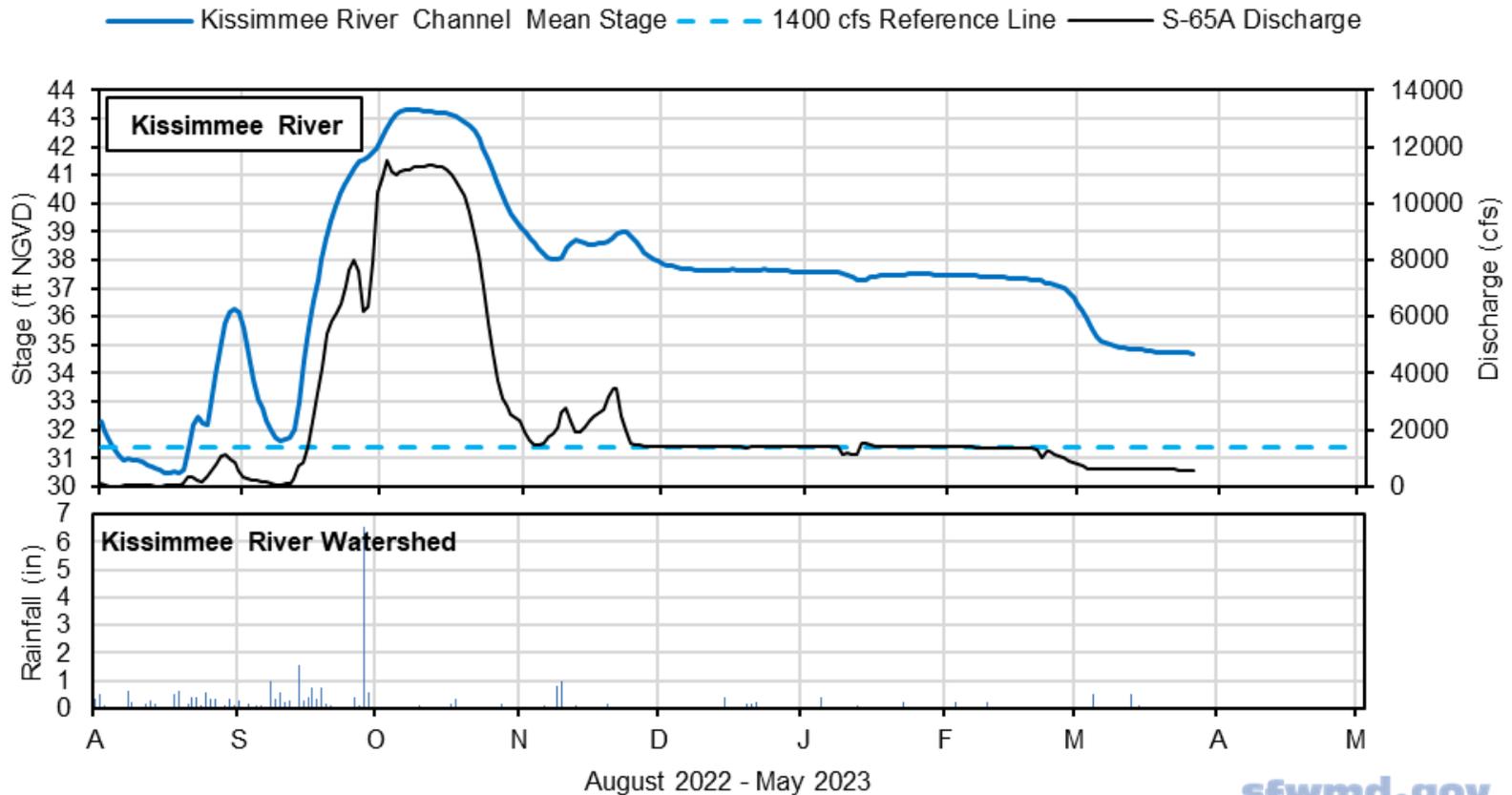
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

f. Mean of five river channel stations (PC62, KRDR02, KRBN, PC33, PC11) in the Phase I area.

g. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).

Stage and Discharge Hydrograph (report date: 3/28/2023; data through: 3/26/2023)



*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.



Figure KB-4. Kissimmee River stage, discharge and rainfall.

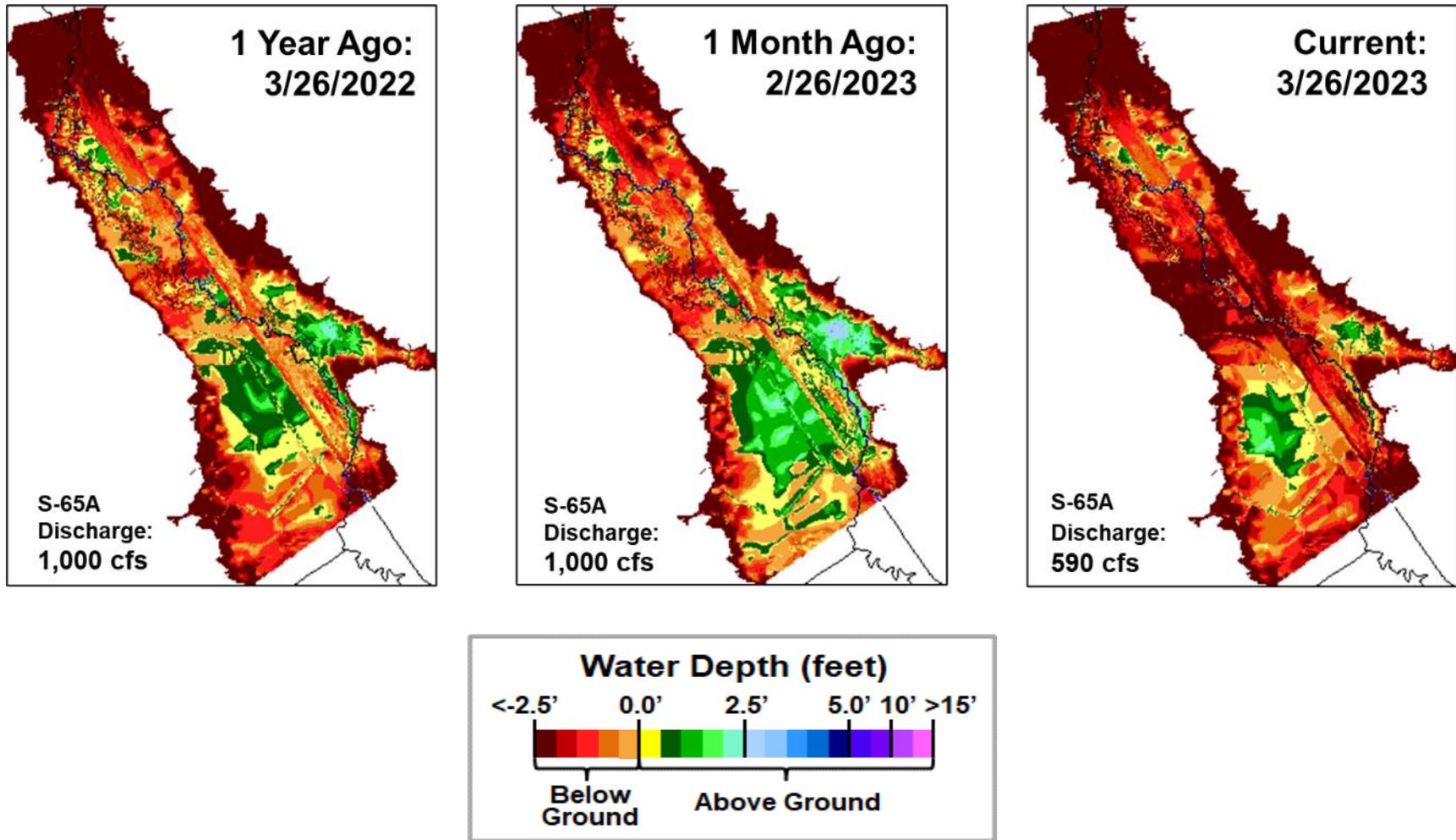
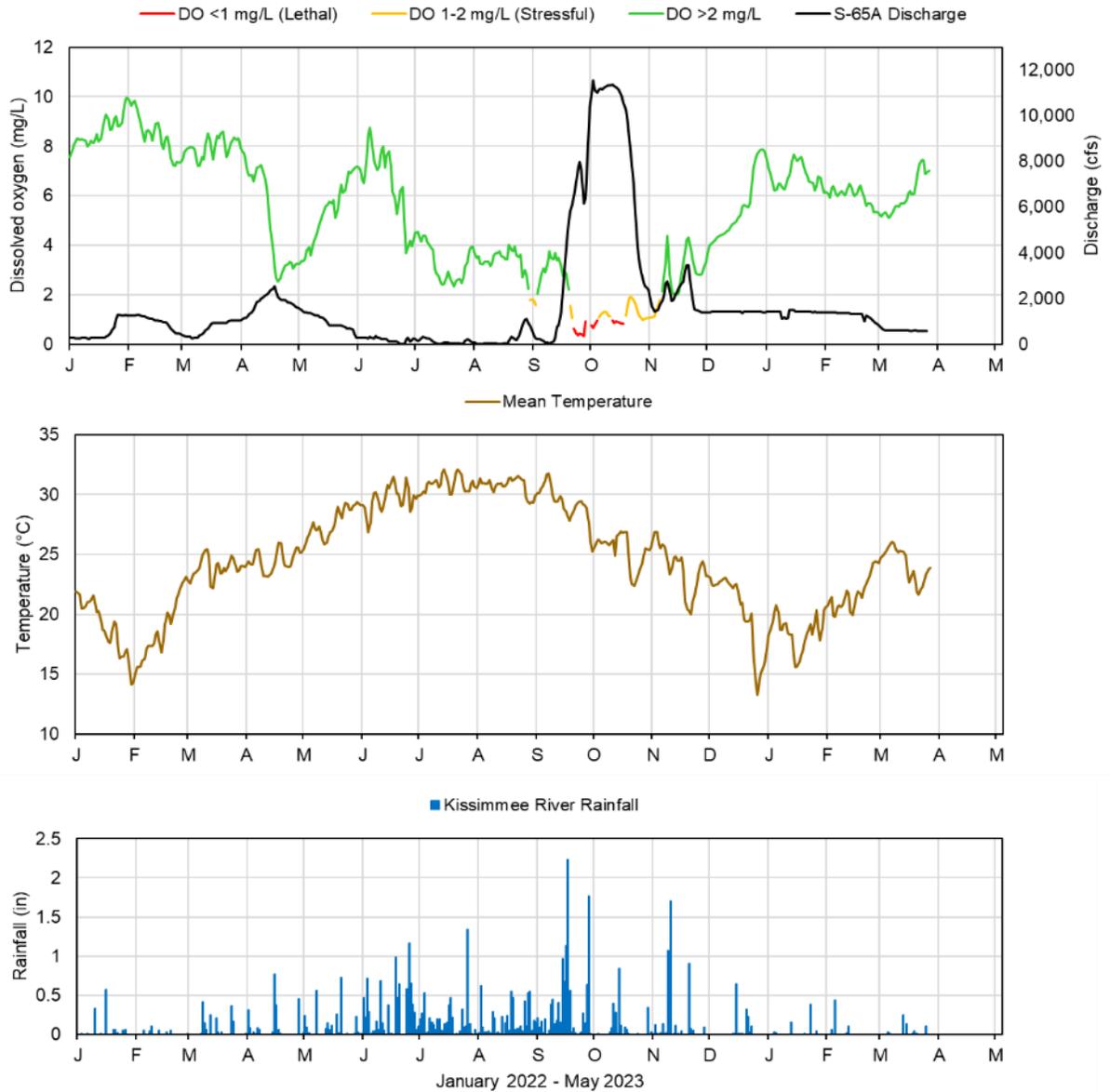


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 3/28/2023; data are through: 3/26/2023



Figure KB-6. Restored Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of five stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

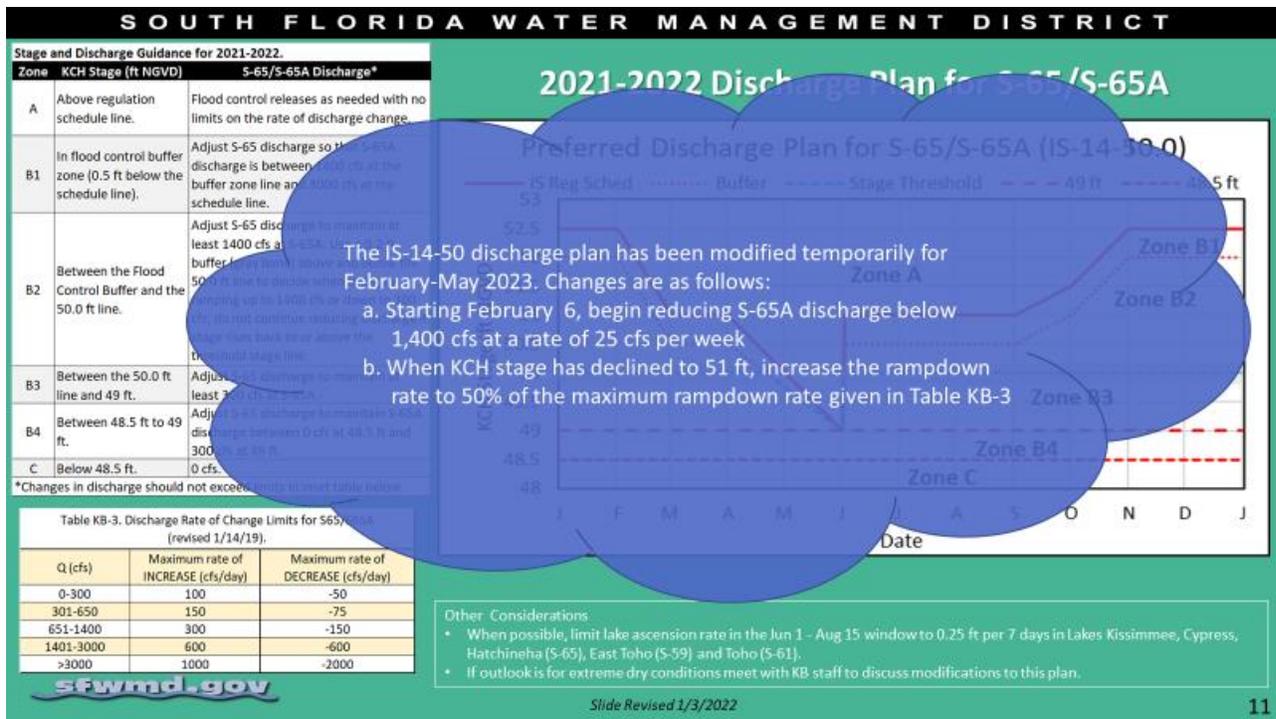


Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 14.71 feet NGVD on March 26, 2023, which is 0.18 feet lower than the previous week and 0.87 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 0.21 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.19 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) were similar to the previous week, going from 625 cfs to 551 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week, going from 3,203 cfs to 4,576 cfs. Most of the inflow (96%) came from the Kissimmee River (C-38 Canal; 528 cfs). Outflows to the west via the S-77 structure averaged 1,823 cfs for the week. Outflows to the east via the S-308 structure averaged 397 cfs and outflows south via the S-350 structures averaged 1,994 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

Water sampling is on the non-bloom season schedule, with monthly WQ samples collected at approximately 32 stations and taxa/toxin data collected from 9 of the 32 stations. For samples collected on March 6-8th, no samples had chlorophyll *a* value above 20 µg/L, however the two sites in the western Fisheating Bay were not sampled. Only one of the 9 sites had detectable toxin levels and 4 sites had cyanobacteria communities dominated by *Microcystis aeruginosa* (**Figure LO-6**).

The most recent satellite image (March 26, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed moderate bloom potential in some nearshore regions of the Lake, especially in Fisheating Bay and the southern bays, but scattered low to moderate potential in the northwestern and northern pelagic regions (**Figure LO-7**).

**1 Month Ago:
02/26/2023**

**Current:
03/26/2023**

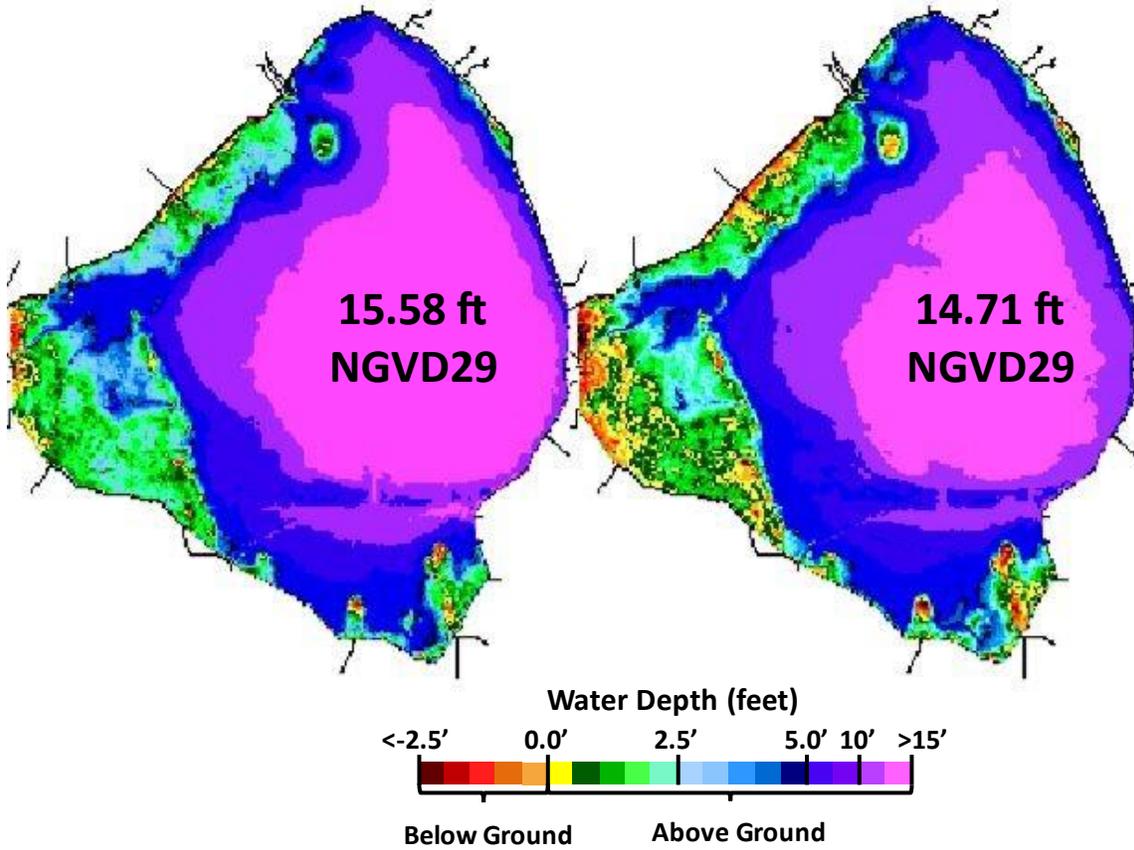


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

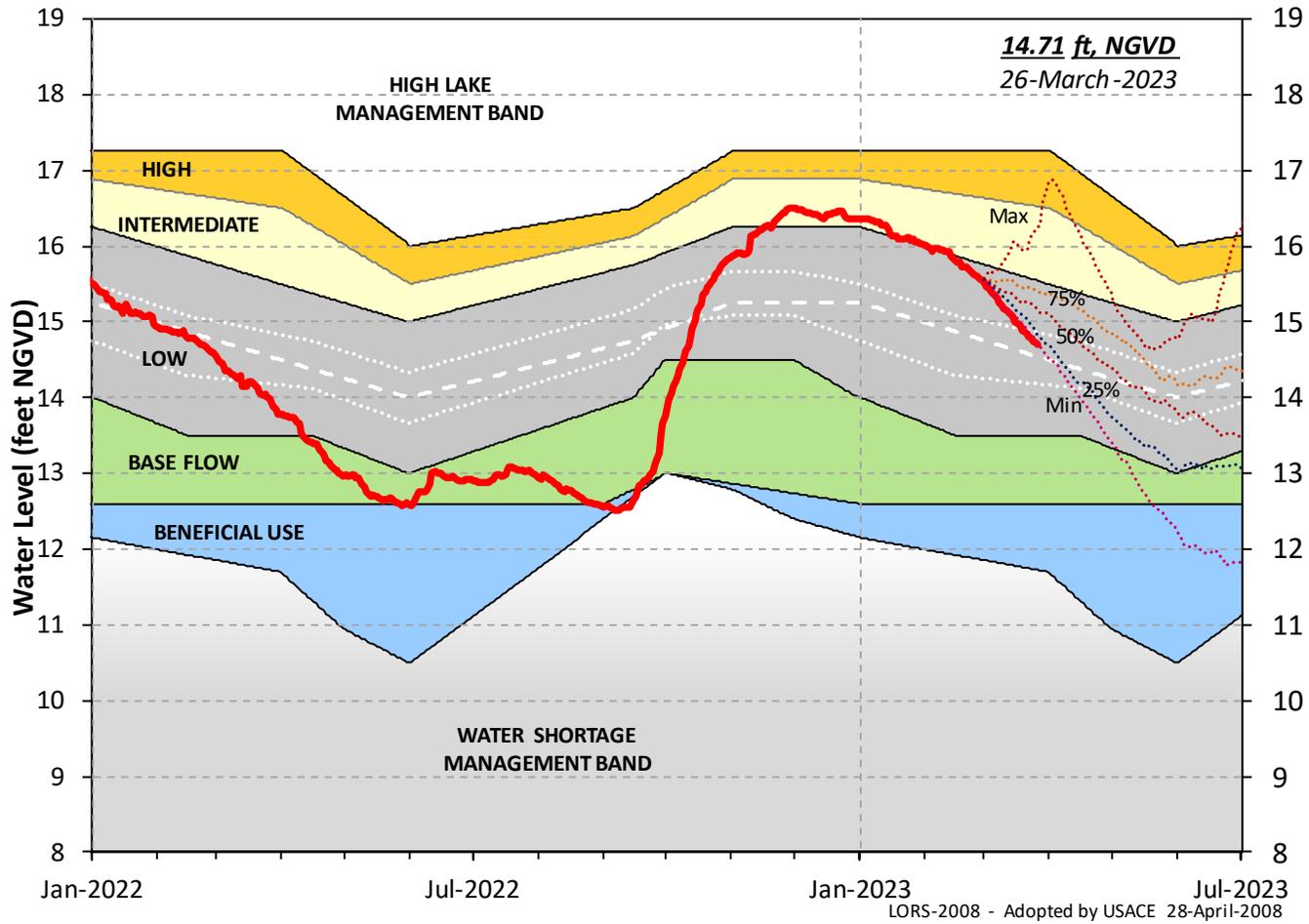


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

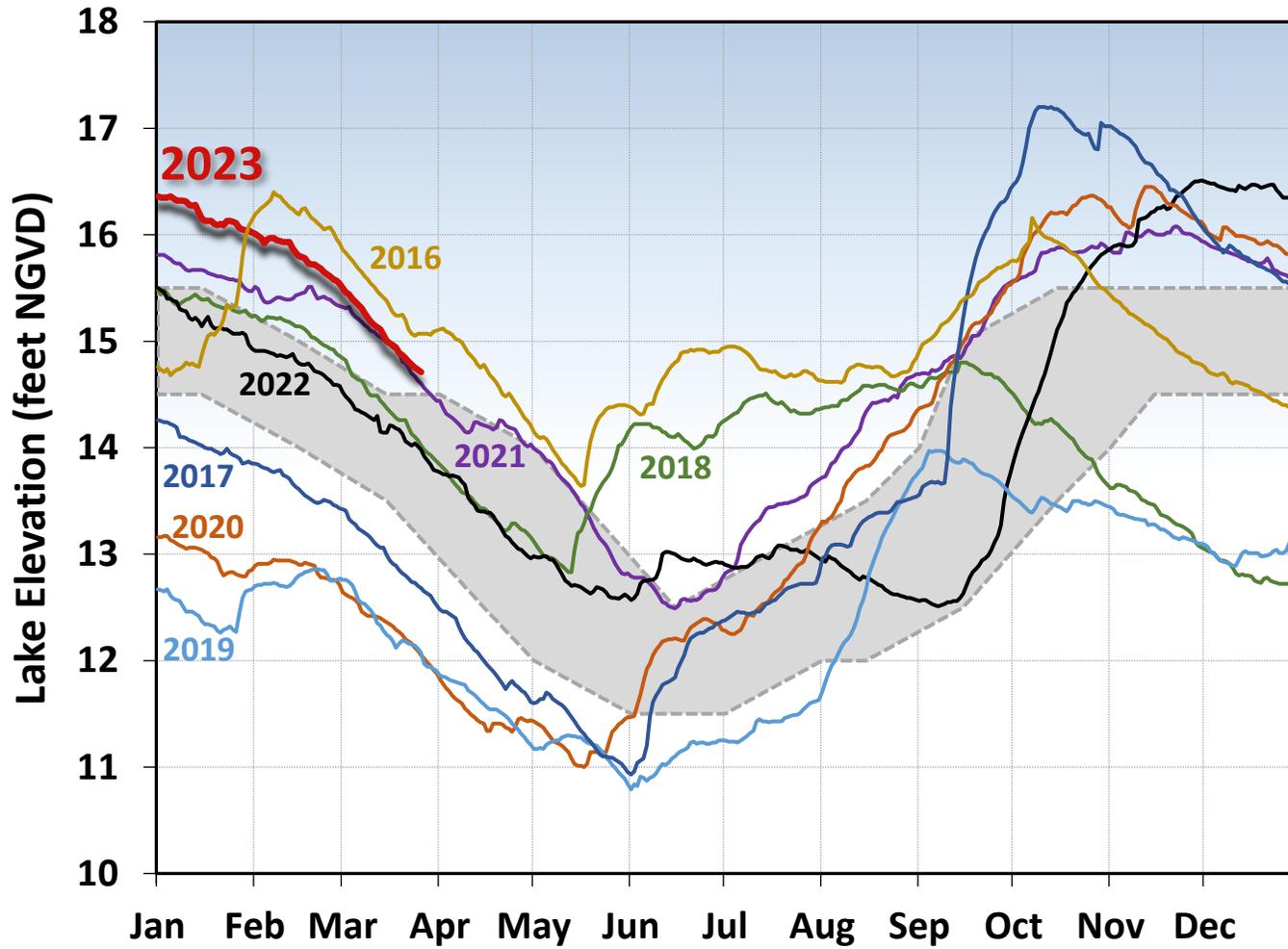


Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

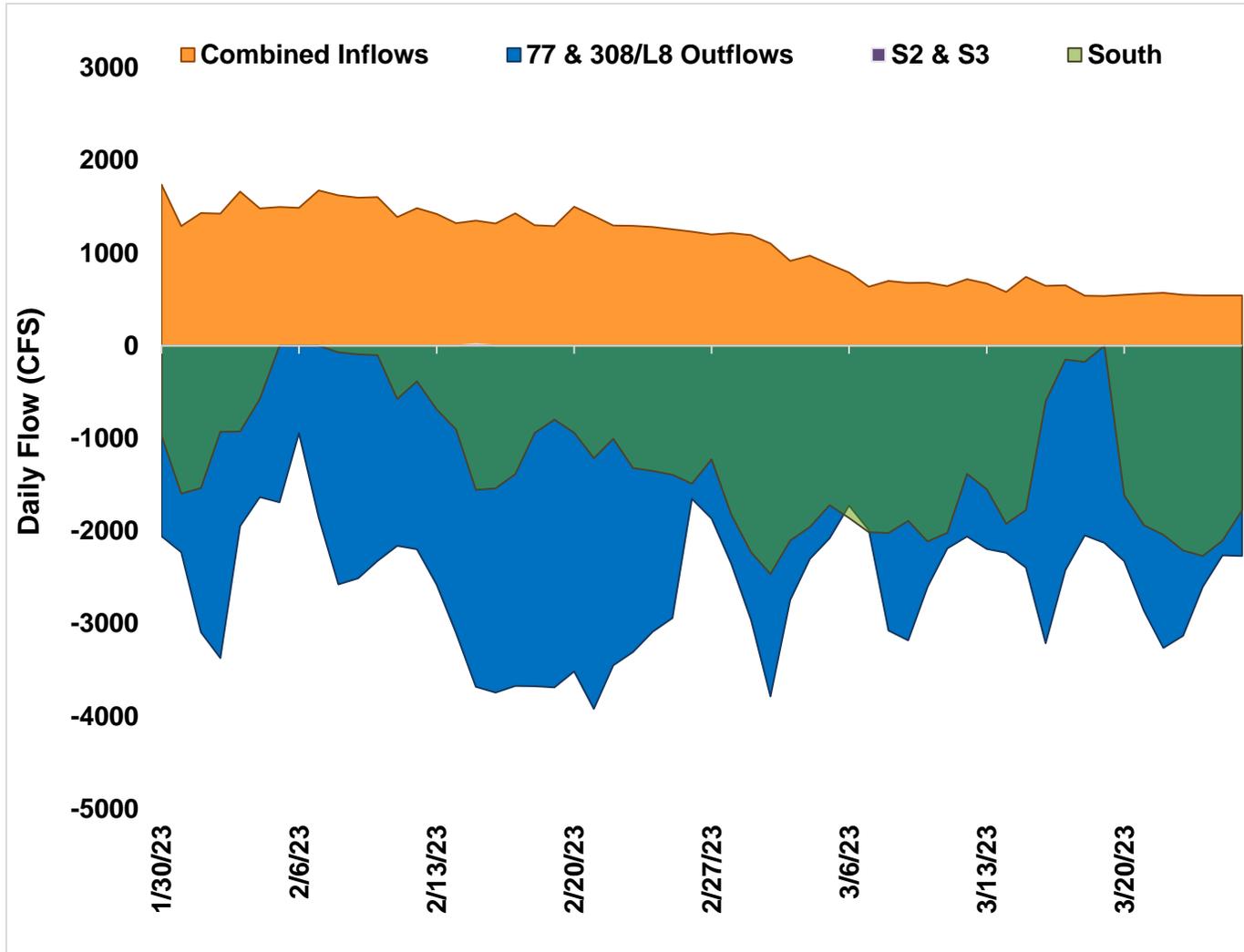


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.

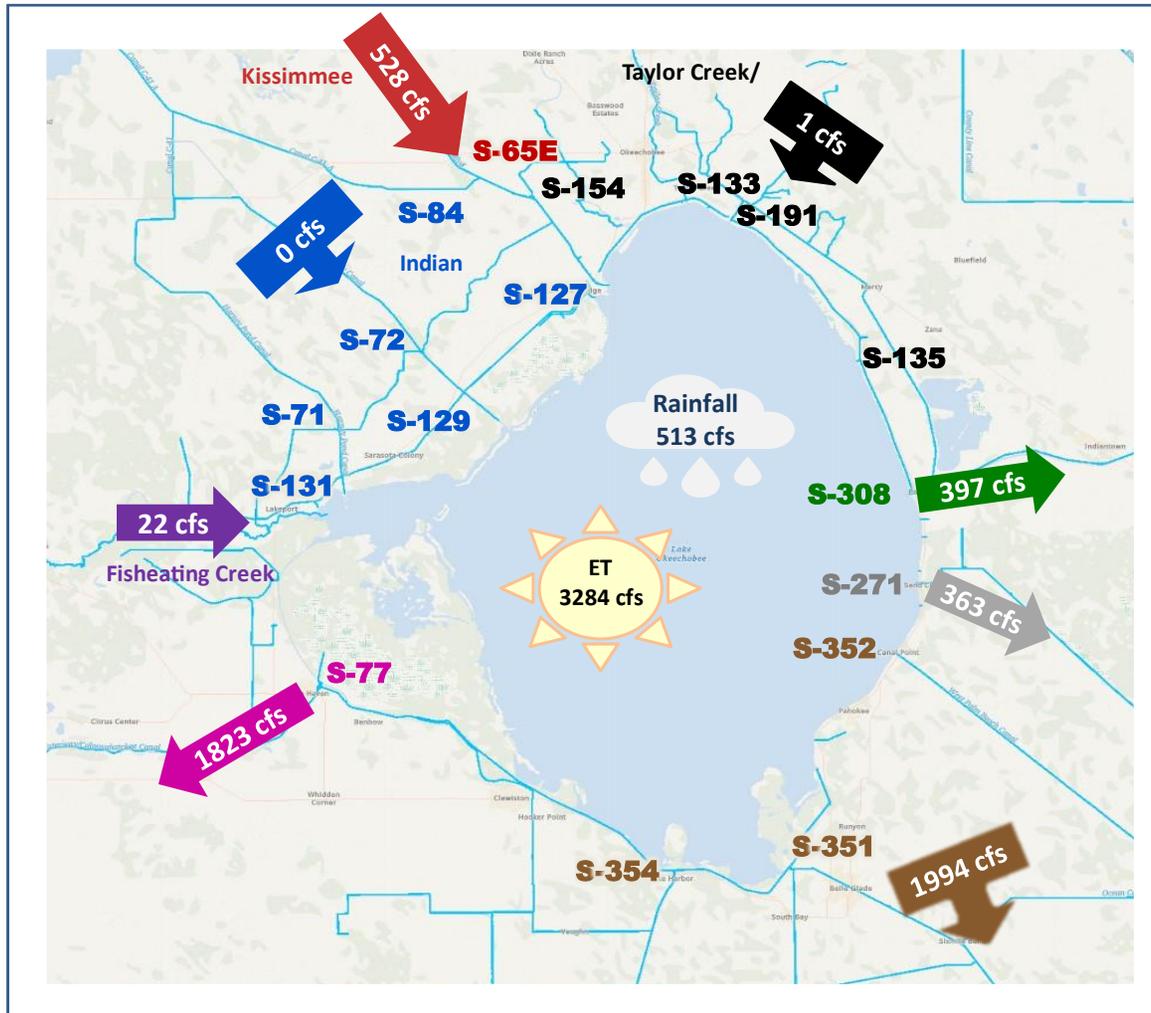


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of March 20 – March 26, 2023.

Collection Date: March 6-8, 2023

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA	Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	NS			L001	5.0		
FEBOUT	NS			L004	4.5		
KISSR0.0	10.1	BDL	mixed	L006	0.4		
L005	11.0	BDL	<i>Microcys</i>	L007	0.2		
LZ2	12.4	BDL	mixed	L008	12.2		
KBARSE	0.3			LZ30	0.4	BDL	mixed
RITTAE2	0.4	BDL	mixed	LZ40	0.3		
PELBAY3	0.4			CLV10A	0.3	BDL	<i>Microcys</i>
POLE3S	7.3			NCENTER	2.1		
LZ25A	0.3						
PALMOUT	0.7	BDL	<i>Microcys</i>	S308C	17.8	0.5	<i>Microcys</i>
PALMOUT1	0.4			S77	4		
PALMOUT2	0.3						
PALMOUT3	0.3						
POLESOUT	12.3	BDL	mixed				
POLESOUT1	17.7						
POLESOUT2	10.0						
POLESOUT3	7.9						
EASTSHORE	6.1						
NES135	5.9						
NES191	6.5						

- SFWMD considers >40µg/L Chlorophylla (Chla) an algal bloom
 - BDL – Below Detectable Limit of 0.25 µg/L
 - ND – No Dominant taxa
 - P – Pending
 - NS – Not Sampled
 - Station bold font – crew observed possible BGA
 - Chlorophyll a analyzed by SFWMD
 - Toxin and Taxa analyzed by FDEP:
- Microcys* = *Microcystis*; *Cylindro* = *Cylindrospermopsis*;
Planktol = *Planktolyngbya*; *Dolicho* = *Dolichospermum*

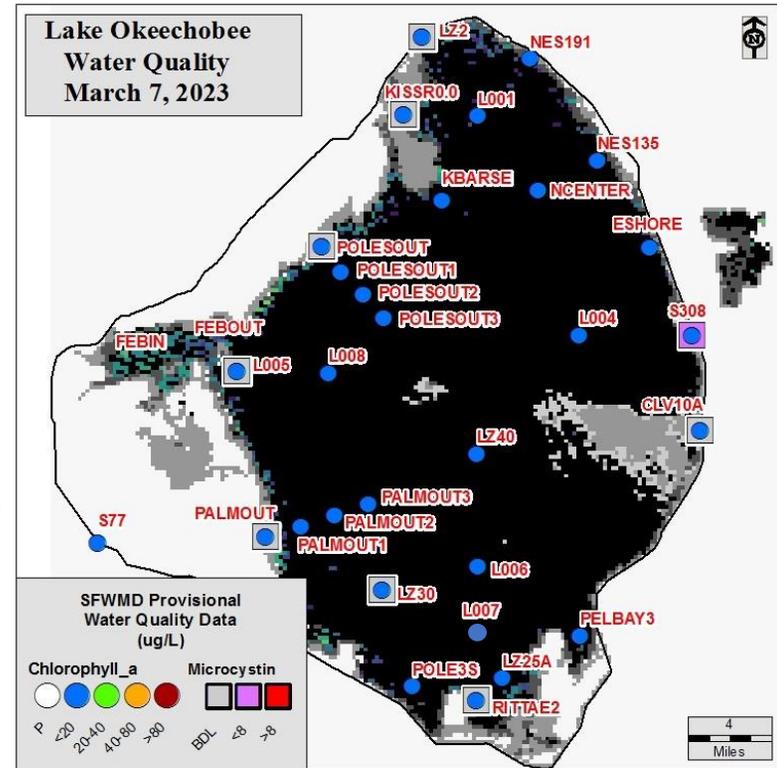


Figure LO-6. Preliminary water quality data from March 6-8, 2023, including chlorophyll a, dominant cyanobacterial taxa (where available), and microcystin toxin concentrations (where available). Sampling locations and select water quality parameters are overlaid on the March 7, 2023, image from NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

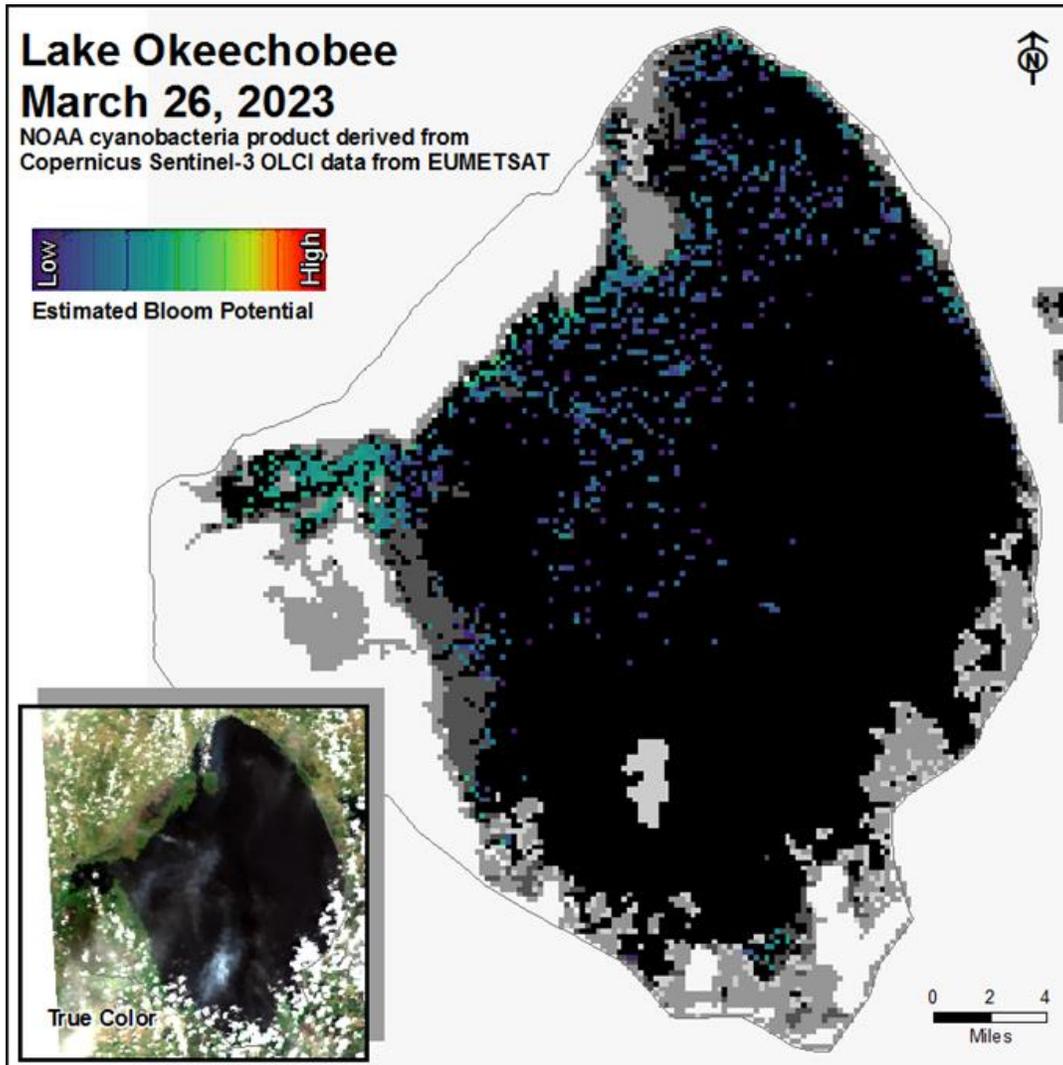


Figure LO-7. Cyanobacteria bloom potential on March 26, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 357 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 86 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 20.6. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 0.01 spat/shell for February, which is normal for this time of year when most oysters are resting and not actively spawning (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,002 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 1,987 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities remained the same at S-79, Val I-75 and Sanibel, increased at Shell Point, and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 0.03 spat/shell at Iona Cove and 0 spat/shell at Bird Island for February, which is normal for this time of year when most oysters are resting and not actively spawning (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 52 cfs. Model results from all scenarios predict daily salinity to be 1.5 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

¹ Qui, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

Red Tide

The Florida Fish and Wildlife Research Institute reported on March 24, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from St. Lucie, Martin, or Miami-Dade counties.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are dry. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

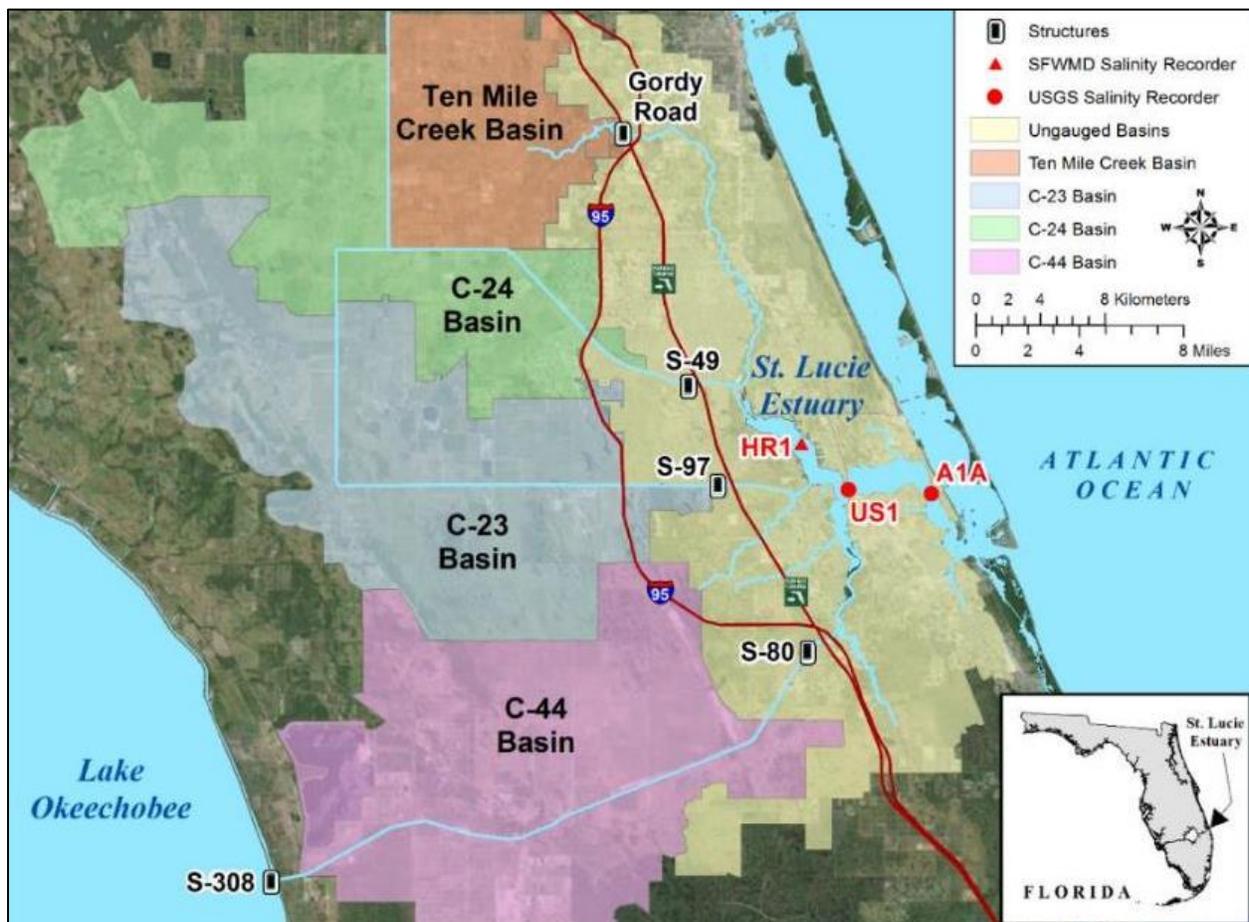


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

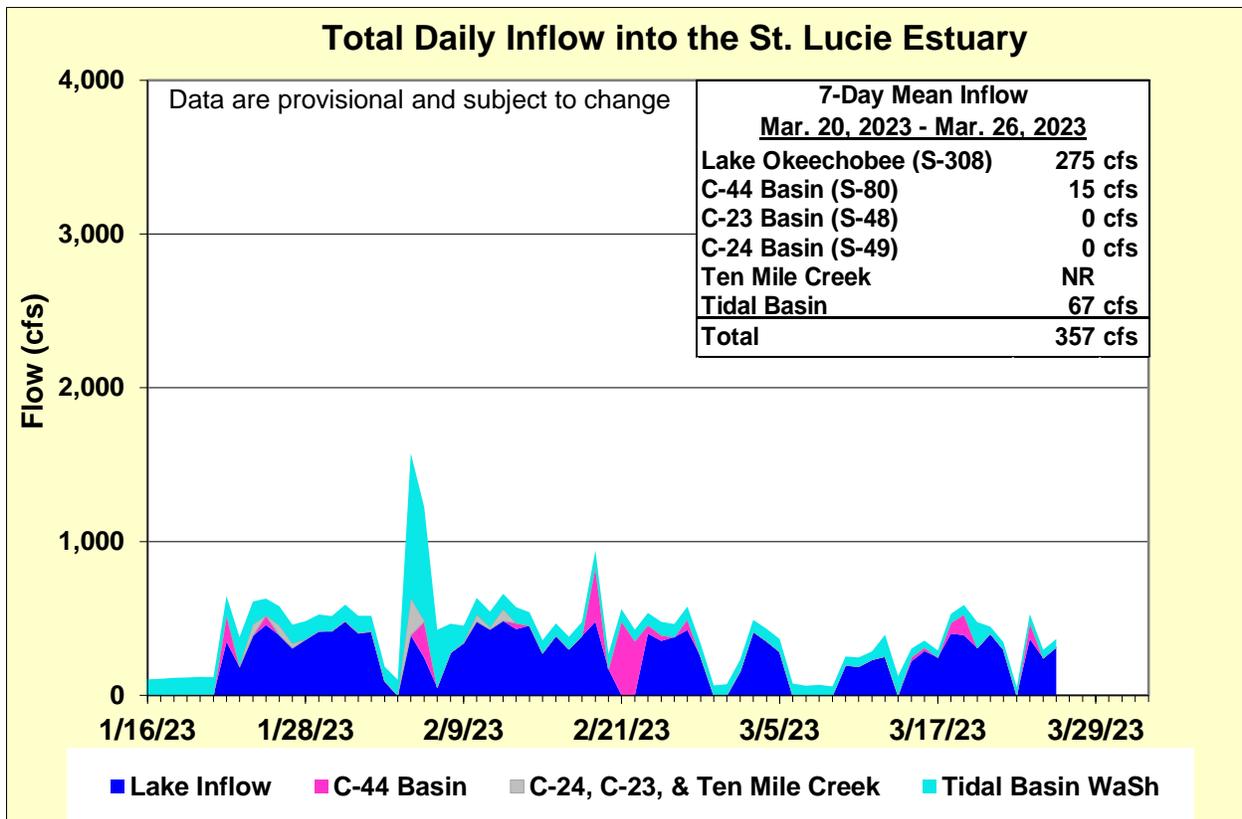


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

Table ES-1. Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	18.7 (19.2)	19.1 (20.5)	10.0 – 25.0
US1 Bridge	20.4 (21.4)	20.9 (22.6)	10.0 – 25.0
A1A Bridge	27.9 (28.7)	29.7 (30.1)	10.0 – 25.0

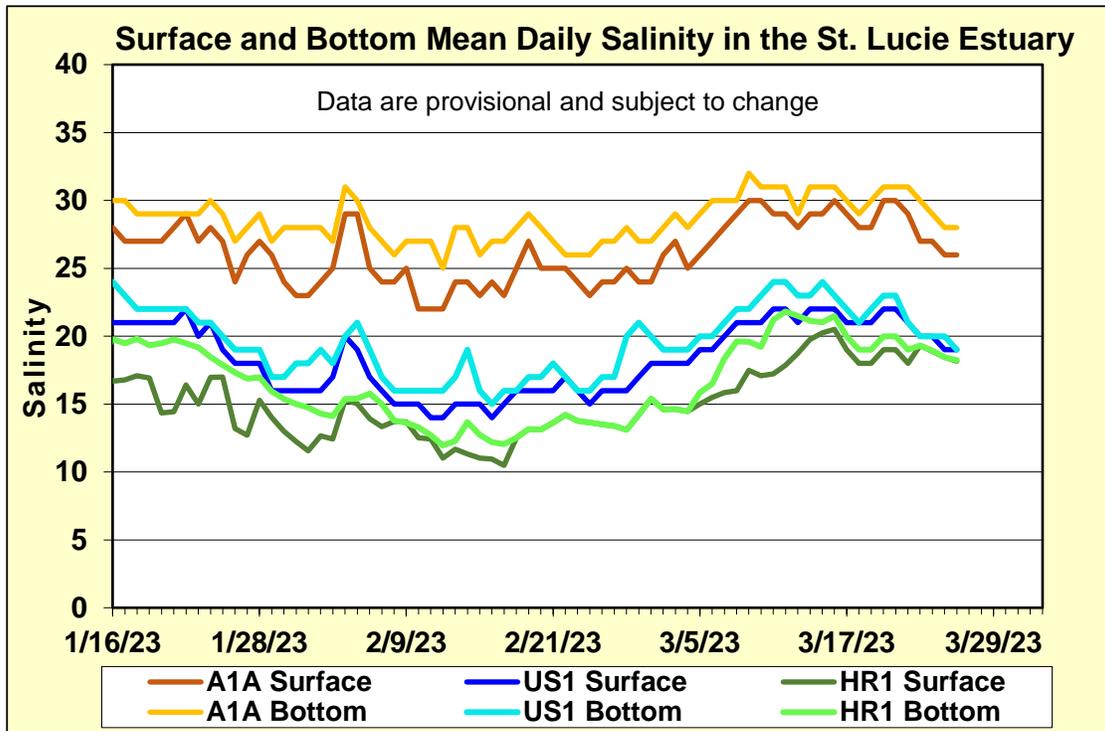


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

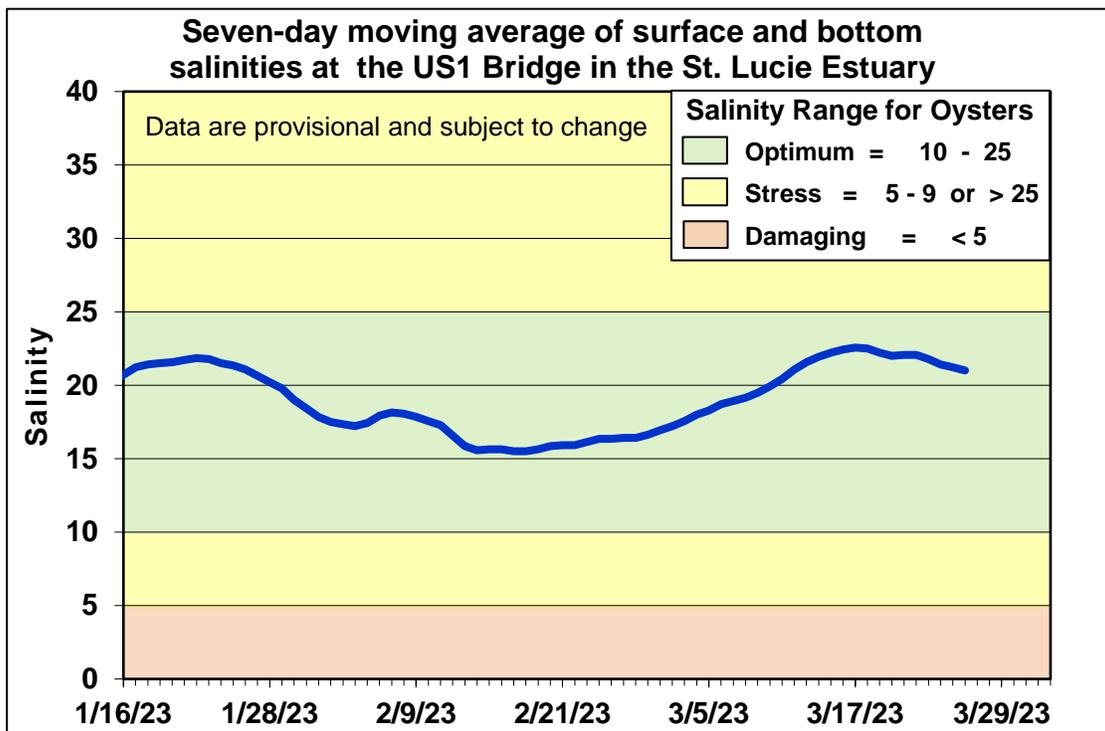


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

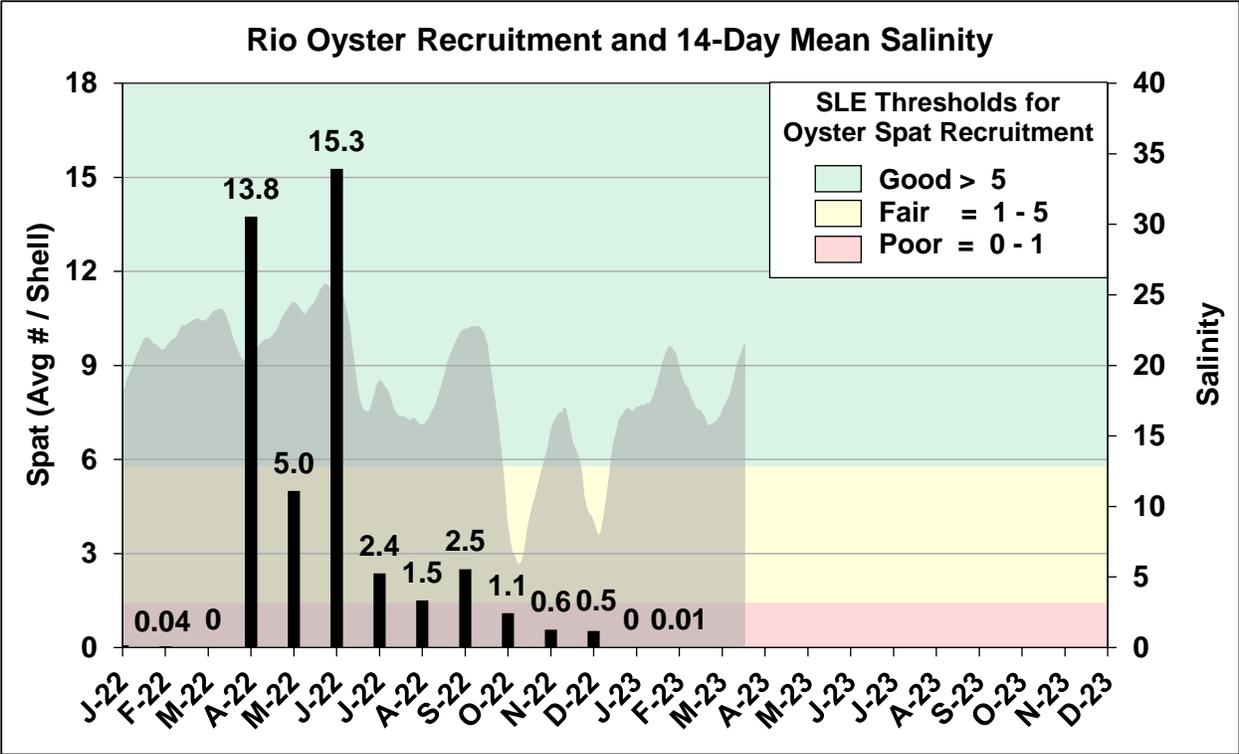


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

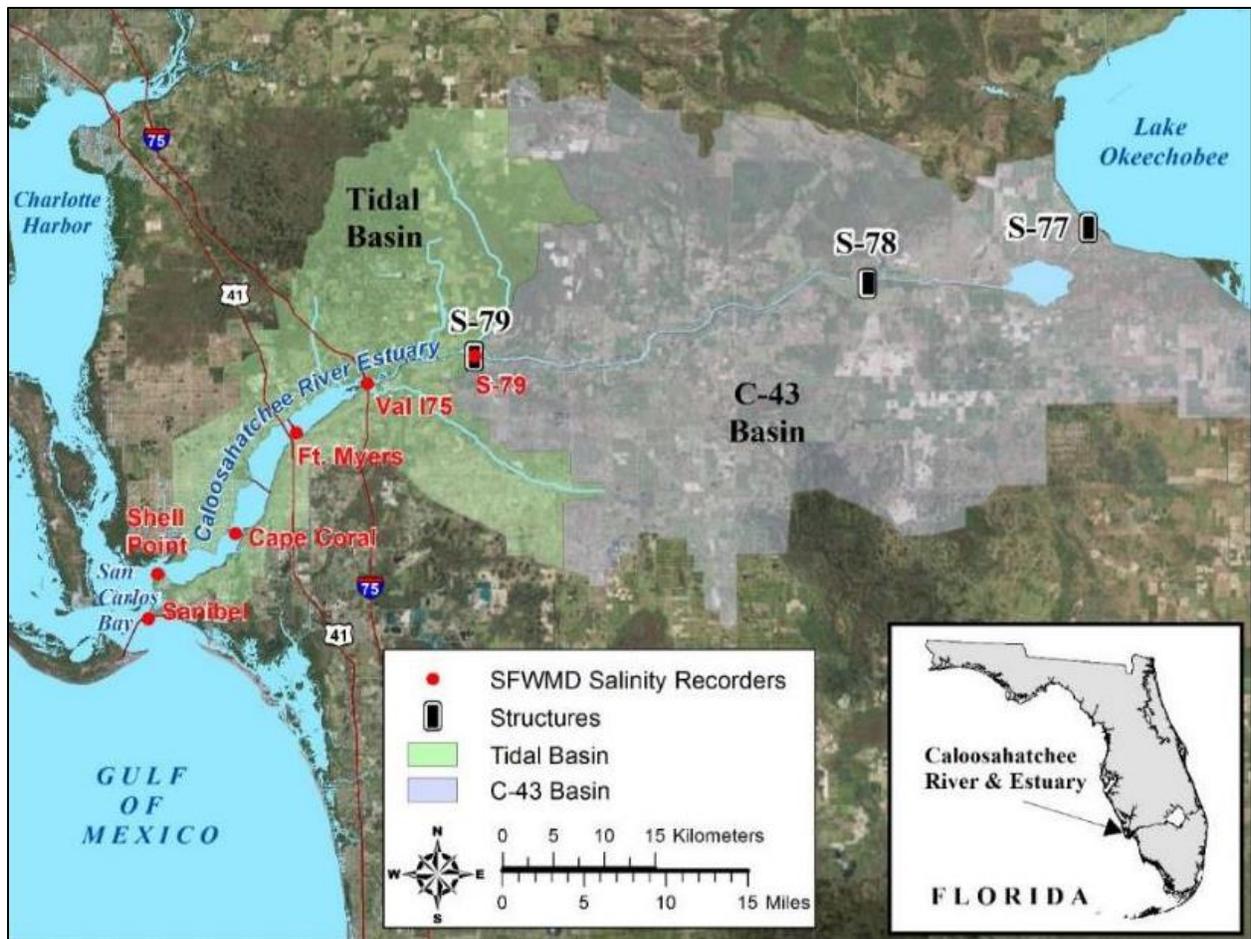


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

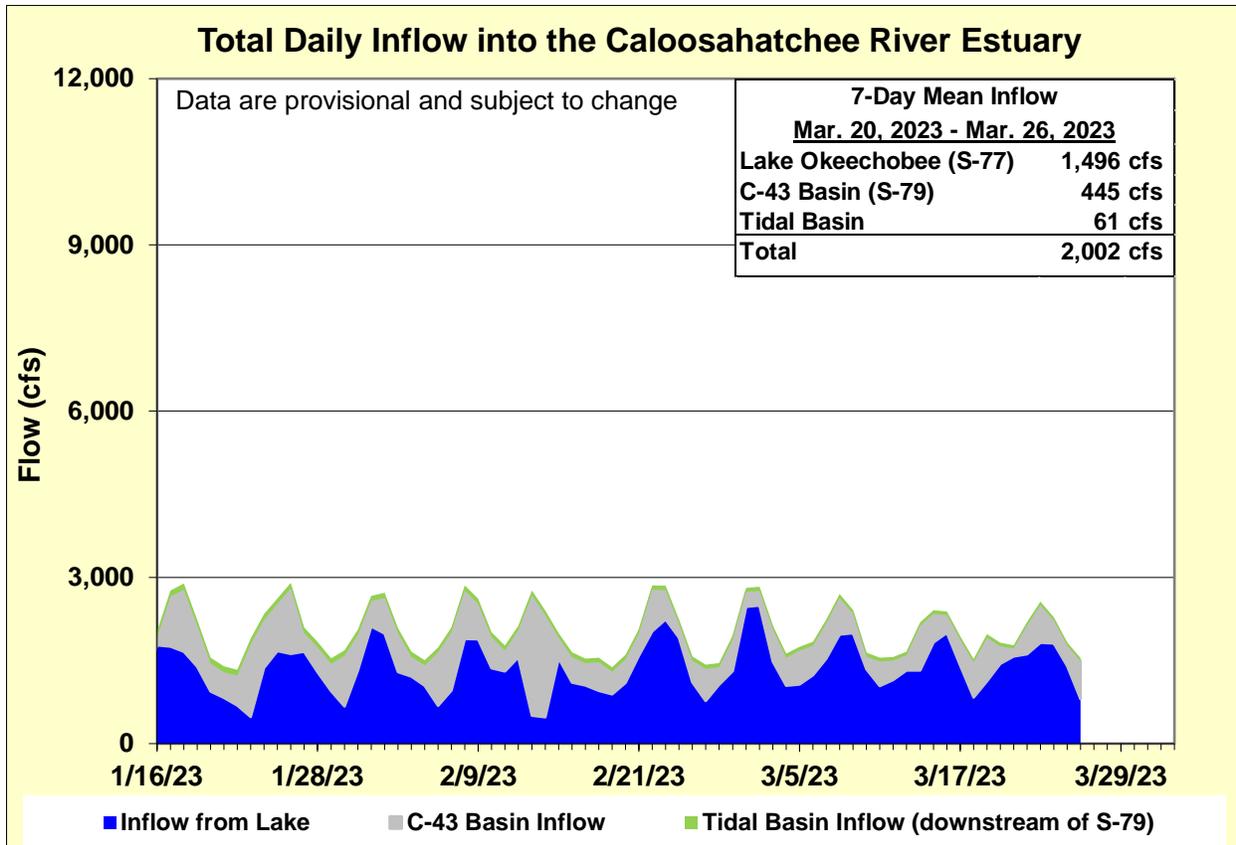


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	0.0 – 10.0
Val I-75	0.3 (0.3)	0.3 (0.4)	0.0 – 10.0
Fort Myers Yacht Basin	4.4 (4.6)	5.2 (7.1)	0.0 – 10.0
Cape Coral	12.2 (13.0)	13.8 (15.2)	10.0 – 25.0
Shell Point	27.7 (27.2)	28.3 (28.0)	10.0 – 25.0
Sanibel	32.4 (32.4)	32.8 (32.9)	10.0 – 25.0

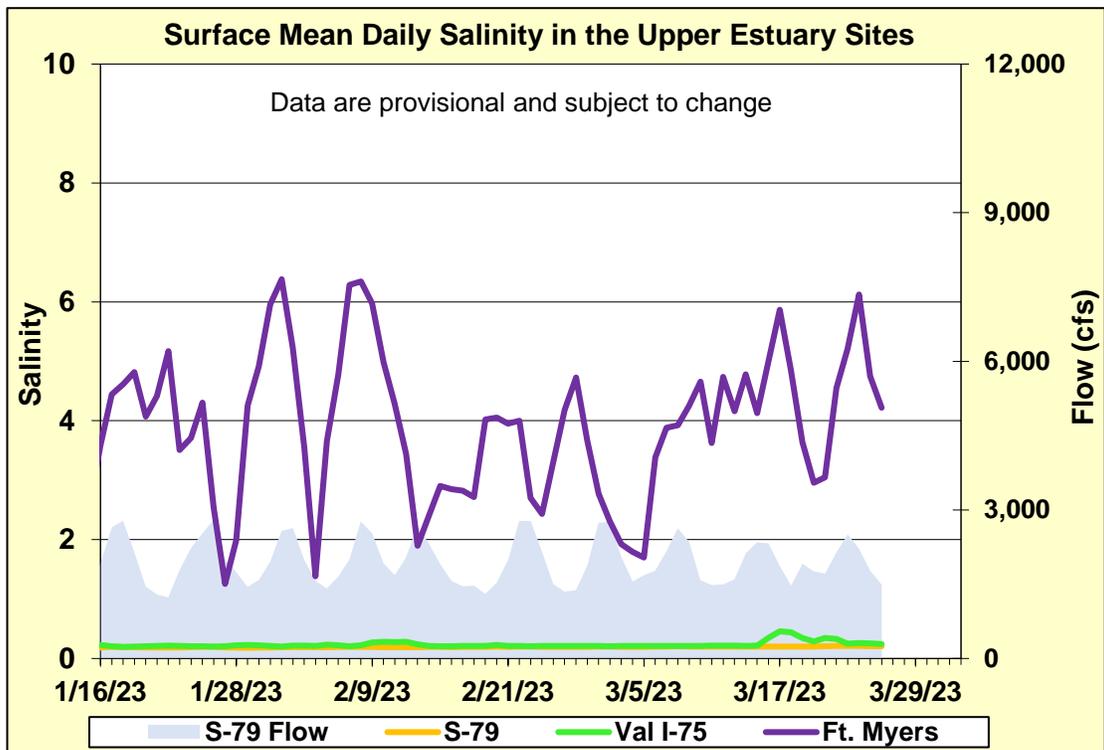


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

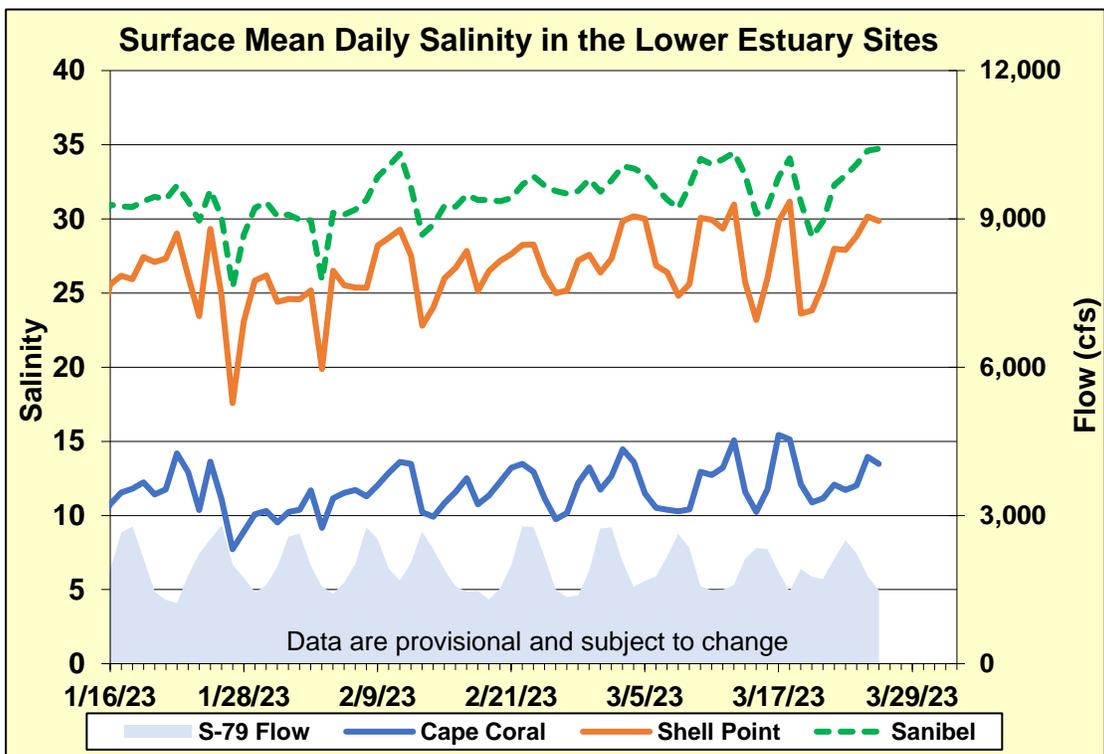


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

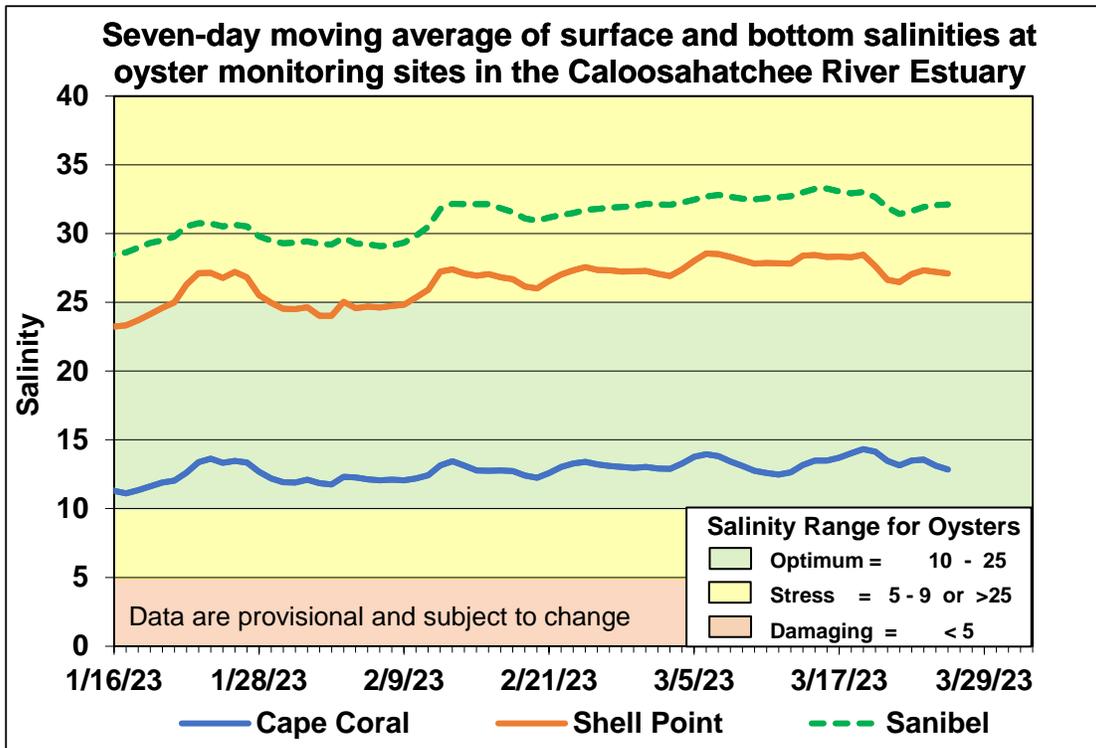


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

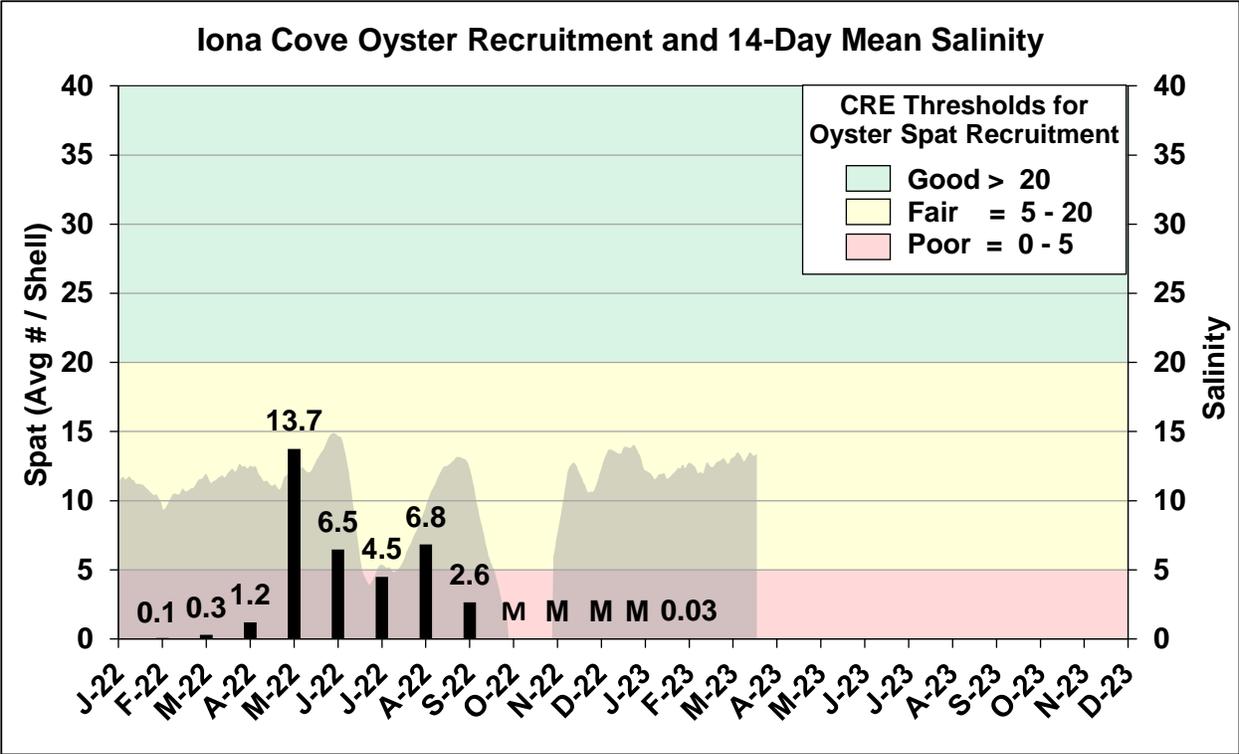


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

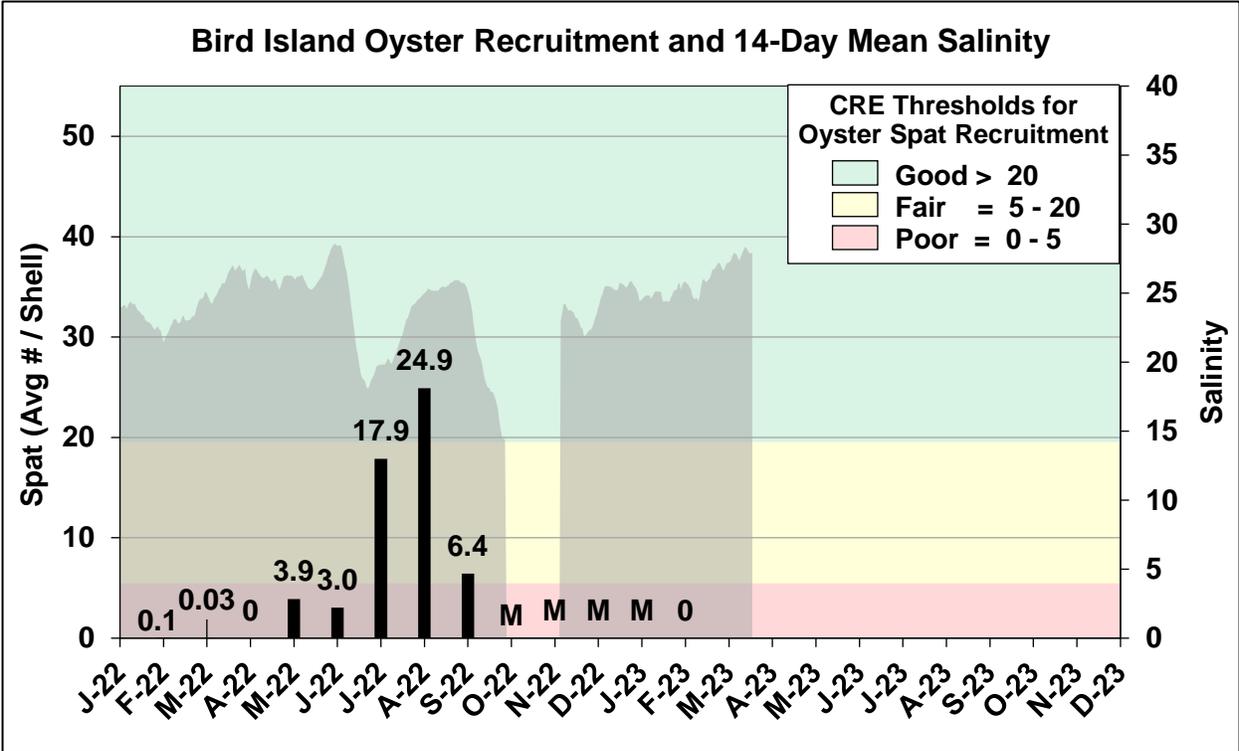


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	52	1.5	0.5
B	450	52	0.7	0.4
C	750	52	0.5	0.4
D	1000	52	0.3	0.3
E	1500	52	0.3	0.3
F	2000	52	0.3	0.3

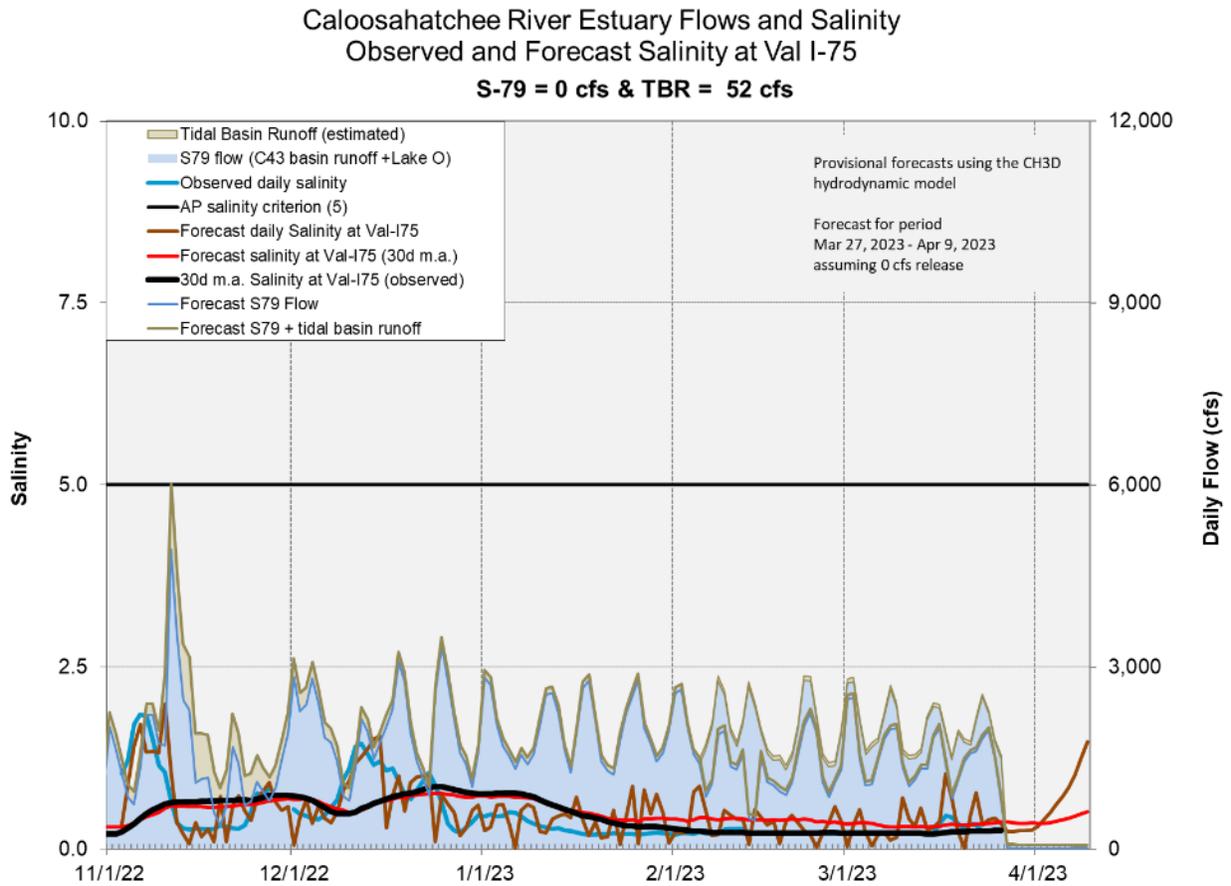


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. The Eastern Flow-way contains nests of Migratory Bird Treaty Act protected species. Online treatment cells are at or near target stage and vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rate (PLR) for the Eastern Flow-way is below 1.0 g/m²/year. The 365-day PLR for the Central Flow-way is high (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Treatment cells are at target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is below 1.0 g/m²/year. The 365-day PLRs for the Northern and Western Flow-way are high (**Figure S-2**).

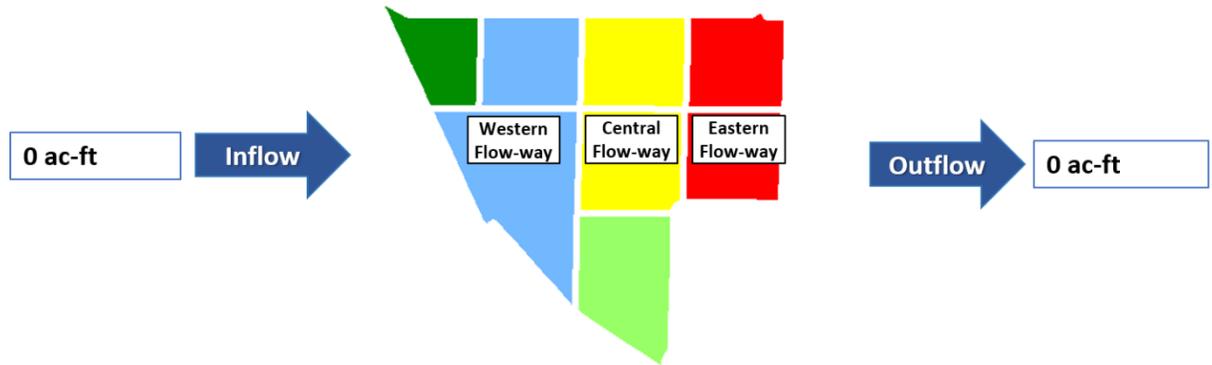
STA-2: STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 4 and 5 are below 1.0 g/m²/year. The 365-day PLR for Flow-ways 1 and 3 are high (**Figure S-3**).

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m²/year (**Figure S-4**).

STA-5/6: All flow-ways in STA-5/6 are online. Most treatment cells are below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for most flow-ways are at or below 1.0 g/m²/year, except Flow-ways 3 and 4 which are high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

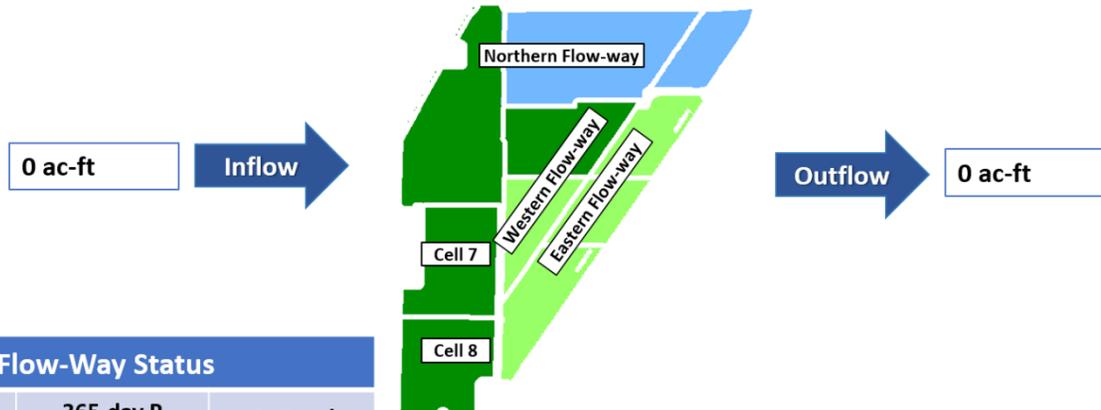
STA-1E Weekly Status Report – 3/20/2023 through 3/26/2023



STA-1E Flow-Way Status				As of 3/26/2023		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
Eastern	←-----→	1.0	Vegetation management / Avian nesting	<ul style="list-style-type: none"> Deep Water Level (> 2.8' above TS) High Water Level (1.5' – 2.8' above TS) 0.2' – 1.5' above TS Target Stage (TS +/- 0.2') 0.2' – 0.5' below TS 0.5' – 1.0' below TS Low Water Level (1.0' – 1.2' below TS) Extreme Low Water (> 1.2' below TS) 	Total Inflow, ac-ft	0	0	125,258	
Central	←-----→	1.0	Vegetation rehabilitation		--Lake Inflow, ac-ft	0	N/A	3,200	
Western	Offline, post-construction grow in starting 3/28/2022				Total Outflow, ac-ft	0	29	99,760	
					Inflow Conc., ppb	N/A	N/A	115	
					Outflow Conc., ppb	N/A	18	25	
					Includes Preliminary Data				

Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 3/20/2023 through 3/26/2023



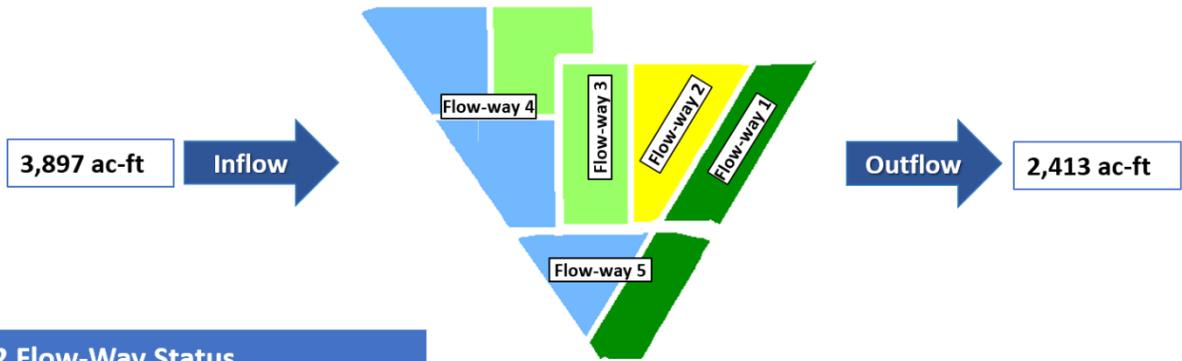
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern	← →		Vegetation management
Western	← →		Vegetation management
Eastern	← →		Vegetation management
Cell 7	← →	N/A	Online
Cell 8	← →	N/A	Construction

As of 3/26/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-1W Flow & Phosphorus Concentration				
	7-day	28-day	365-day	
Total Inflow, ac-ft	0	5,536	144,603	
--Lake Inflow, ac-ft	0	N/A	8,100	
Total Outflow, ac-ft	0	0	147,436	
Inflow Conc., ppb	N/A	153	201	
Outflow Conc., ppb	N/A	N/A	20	
Includes Preliminary Data				

Figure S-2. STA-1W Weekly Status Report

STA-2 Weekly Status Report – 3/20/2023 through 3/26/2023



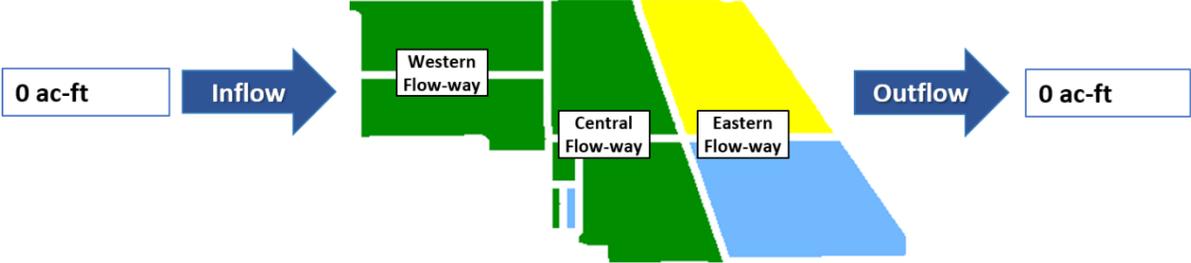
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions
1			Online
2	Offline, post-construction grow in starting 1/23/2023		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 3/26/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	3,897	15,955	320,830
--Lake Inflow, ac-ft	1,700	N/A	29,200
Total Outflow, ac-ft	2,413	9,105	337,760
Inflow Conc., ppb	49	56	113
Outflow Conc., ppb	16	16	30
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

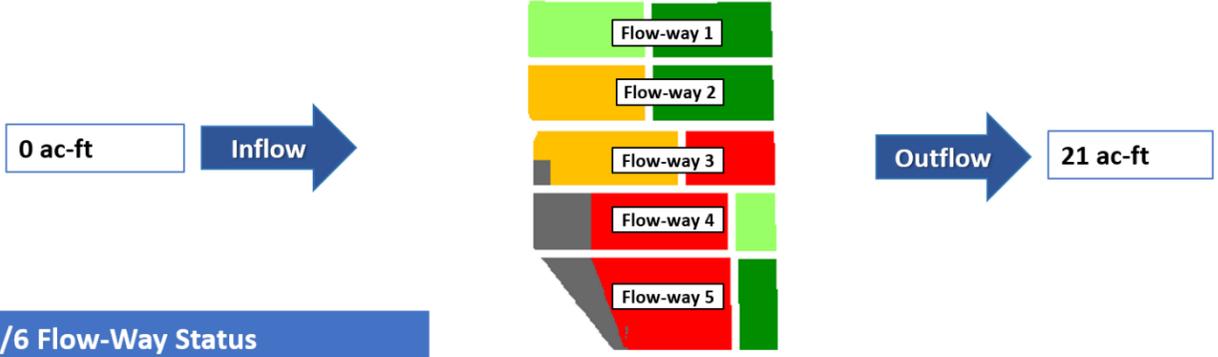
STA-3/4 Weekly Status Report – 3/20/2023 through 3/26/2023



STA-3/4 Flow-Way Status				As of 3/26/2023		STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<div style="background-color: purple; width: 10px; height: 10px; display: inline-block;"></div> Deep Water Level (> 2.8' above TS) <div style="background-color: blue; width: 10px; height: 10px; display: inline-block;"></div> High Water Level (1.5' – 2.8' above TS) <div style="background-color: lightblue; width: 10px; height: 10px; display: inline-block;"></div> 0.2' – 1.5' above TS <div style="background-color: green; width: 10px; height: 10px; display: inline-block;"></div> Target Stage (TS +/- 0.2') <div style="background-color: lightgreen; width: 10px; height: 10px; display: inline-block;"></div> 0.2' – 0.5' below TS <div style="background-color: yellow; width: 10px; height: 10px; display: inline-block;"></div> 0.5' – 1.0' below TS <div style="background-color: orange; width: 10px; height: 10px; display: inline-block;"></div> Low Water Level (1.0' – 1.2' below TS) <div style="background-color: red; width: 10px; height: 10px; display: inline-block;"></div> Extreme Low Water (> 1.2' below TS)	Total Inflow, ac-ft	0	5	299,702	
Central			Online		--Lake Inflow, ac-ft	0	N/A	2,600	
Western			Online		Total Outflow, ac-ft	0	27	291,801	
					Inflow Conc., ppb	N/A	N/A	94	
					Outflow Conc., ppb	N/A	25	16	
						Includes Preliminary Data			

Figure S-4. STA-3/4 Weekly Status Report

STA-5/6 Weekly Status Report – 3/20/2023 through 3/26/2023



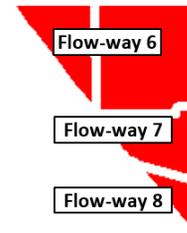
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →		Online
3	← →		Online
4	← →		Online
5	← →		Online

As of 3/26/2023
Stage Based: Relative to Target Stage (TS)
Deep Water Level (> 2.8' above TS)
High Water Level (1.5' – 2.8' above TS)
0.2' – 1.5' above TS
Target Stage (TS +/- 0.2')
0.2' – 0.5' below TS
0.5' – 1.0' below TS
Low Water Level (1.0' – 1.2' below TS)
Extreme Low Water (> 1.2' below TS)

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	0	152,471
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	21	59	148,192
Inflow Conc., ppb	N/A	N/A	289
Outflow Conc., ppb	78	191	40
Includes Preliminary Data			

Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 3/20/2023 through 3/26/2023



STA-5/6 Flow-Way Status				As of 3/26/2023	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				Color	Range
6	←-----→	1.0	Online		Extreme Low Water (> 1.2' below TS)
7	←-----→	1.0	Online		Low Water Level (1.0' – 1.2' below TS)
8	←-----→	1.0	Online		Extreme Low Water (> 1.2' below TS)

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water, $\mu\text{g/L}$ or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

Last week the EPA received more rainfall than previous weeks but still below average. WCA-1: Last week stage at the 1-8C continued to follow just below schedule. The average on Sunday was 0.22 feet below the falling Zone A1 regulation line. WCA-2A: Recession rate slowed at the 2–17 gauge last week. The average on Sunday was 0.82 feet above the flat regulation line. WCA-3A: The Three Gauge Average stage continues to recede faster than the slope of the schedule line. The average stage was 1.00 feet below the falling regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continues a steep recession, the average on Sunday was 1.94 feet below the flat Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool illustrates current stages in the EPA are low in the west, with below ground conditions in northwestern WCA-3A and well below in southern BCNP. There is no longer ponding in the upper reaches of the L-67s as that historically ponded region is now in the 1.5' to 2.0' depth category. Connectivity remains in SRS but diminishes both in that region and in Taylor Slough of ENP. Comparing current WDAT water depths to one month ago conditions within the EPA are shallower more significantly in the west. Looking back a year ago, conditions are also much dryer in the west, and dryer but less so to the east (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year average on March 26: Conditions approach average in northern WCA-2A; now well below in central and southern WCA-3A; above the 80th percentile in portions of northeastern SRS and WCA-3B (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 0.4 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on 17 gauges available for this report. Rainfall ranged from 0.3 inches at Duck Key (DK) in the eastern bay to 0.7 inches in Whipray Basin (WB) in the central bay. Stages at all sites in Taylor Slough decreased over the past week but at a slower rate than the week before. Taylor Slough stage changes averaged a decrease of -0.10 feet and ranged from a decrease of -0.01 feet at Craighead Pond (CP) in southwestern Taylor Slough to -0.23 feet at Taylor Slough Bridge (TSB) in northern Taylor Slough (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +2.0 inches compared to before the Florida Bay initiative (starting in 2017) but decreased -0.6 inches from last week.

Average Florida Bay salinity was 33.8, +0.2 higher than the previous week. Salinity changes ranged from a decrease of -1.6 in Joe Bay (JB) in the eastern nearshore to +1.8 at Buoy Key (BK) in the western bay (**Figure EV-8**). As of 3/26, salinity is just above the 75th percentile in the Eastern and Central Bay, and just below the 75th percentile in the western region (**Figure EV-10**). Florida Bay salinity is +3.3 above its historical average for this time of year, up +0.1 from last week.

Water Management Recommendations

We recommend continued discussion and the utilization of strategies that could prevent further degradation of WCA3A North. Conserving water in this region will most likely prove critical for the upcoming wading bird nesting season. The focus for available inflows should remain on the northeast as that region continues to support an important nesting effort at the Alley North colony. Dry conditions dominate meaning that maintaining a minimum rate of stage recession within the marshes of WCAs and conserving water north in the system has an increased ecological benefit. As conditions remain near the 90th percentile in SRS, when water is available discharge downstream through Taylor Slough. Individual regional recommendations can be found in **Table EV-2**.

Table EV-2. Previous week’s rainfall and water depth changes in Everglades basins.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.11	-0.10
WCA-2A	0.23	-0.10
WCA-2B	0.29	-0.17
WCA-3A	0.31	-0.09
WCA-3B	0.45	-0.06
ENP	0.29	-0.03

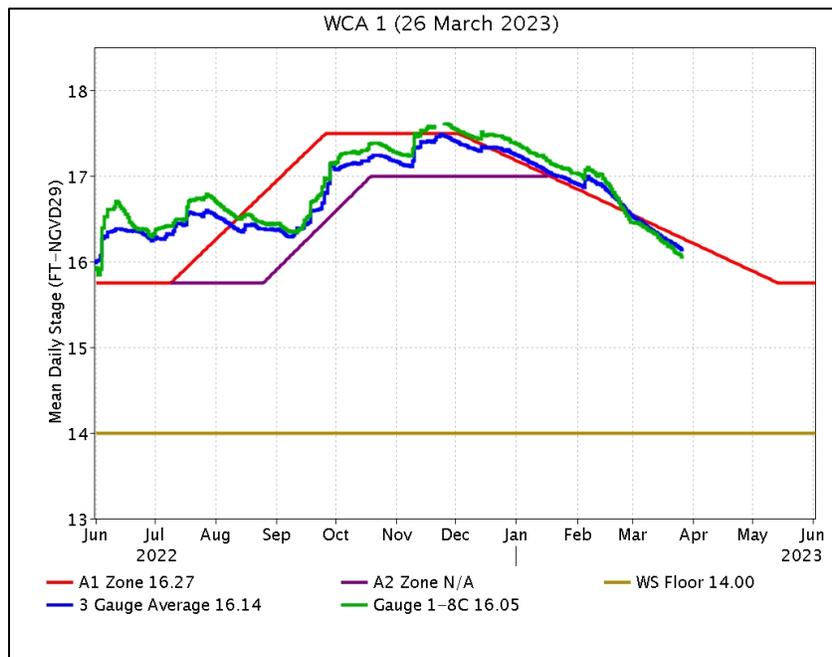


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

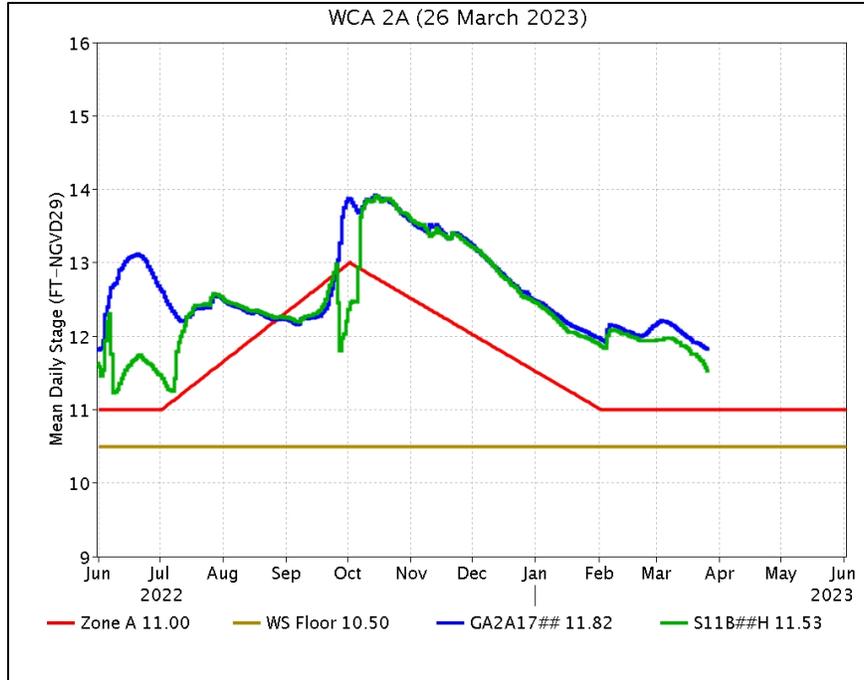


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

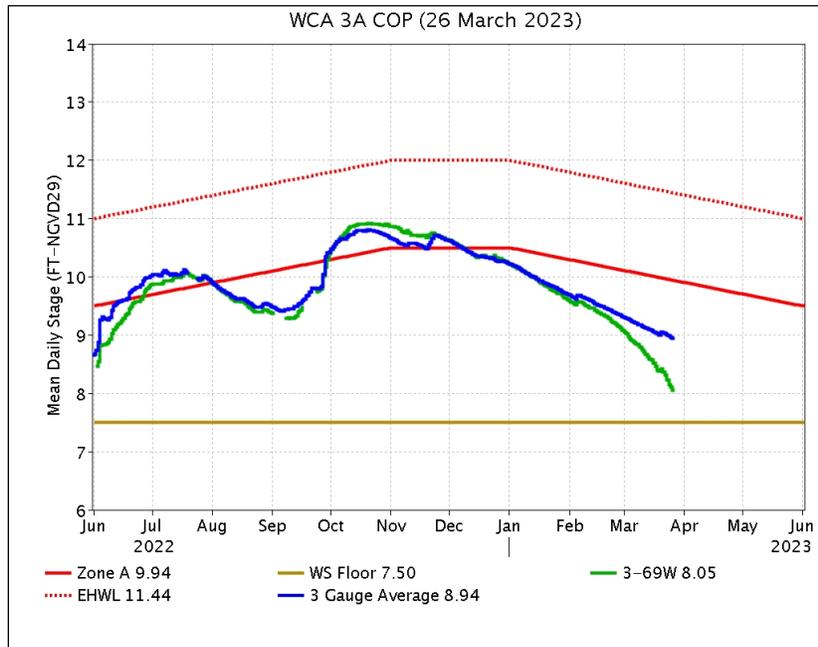


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

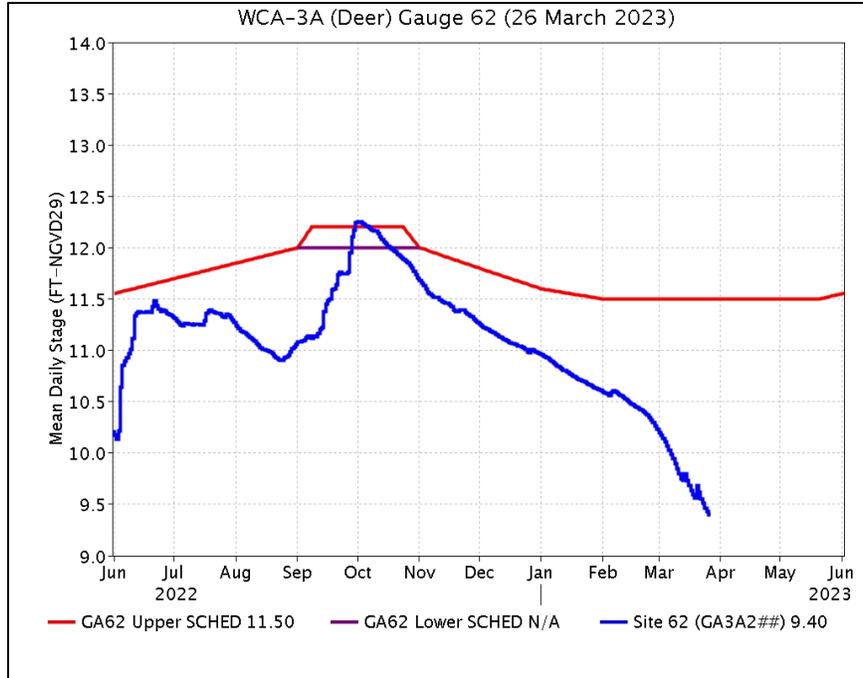


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

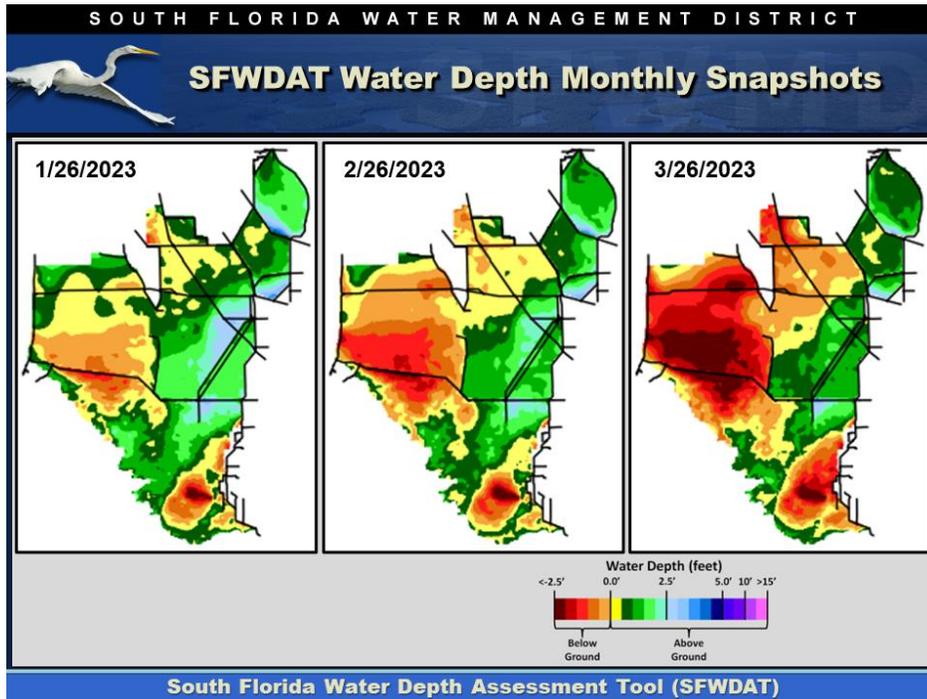


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

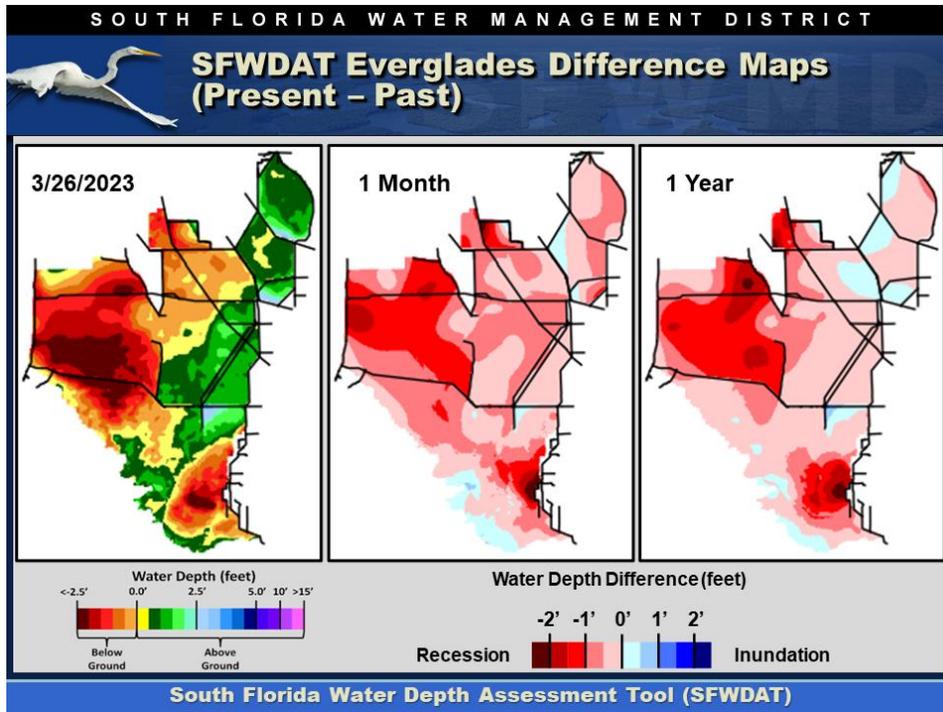


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

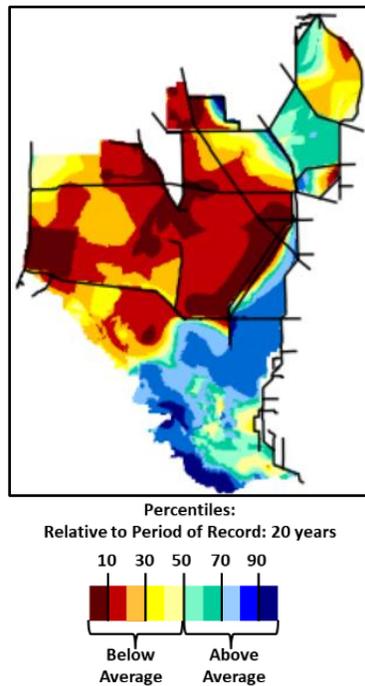


Figure EV-7. Present water depths (3/26/2023) compared to the day of year average over the previous 20 years.

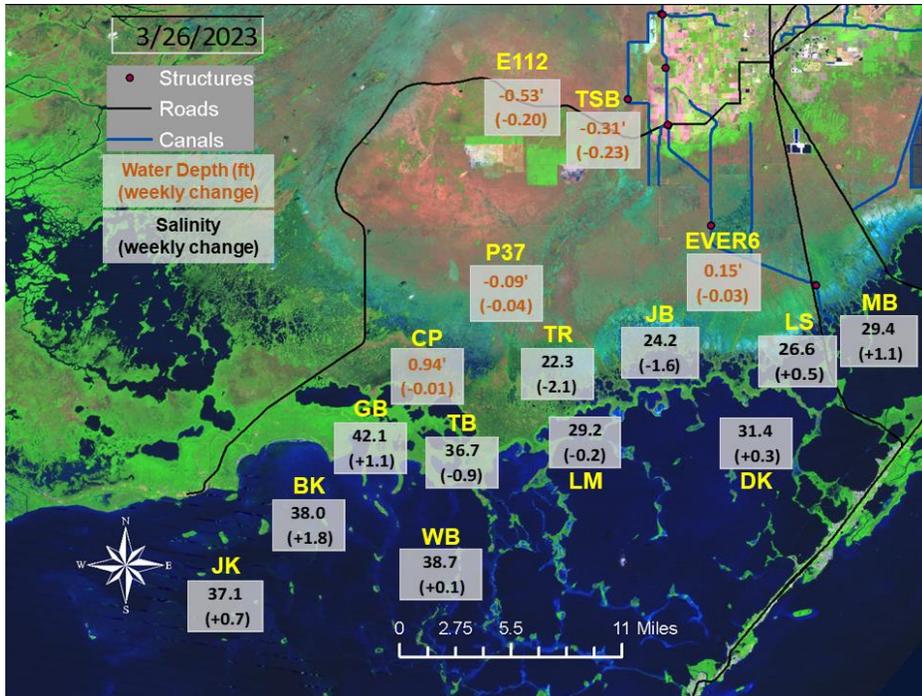


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

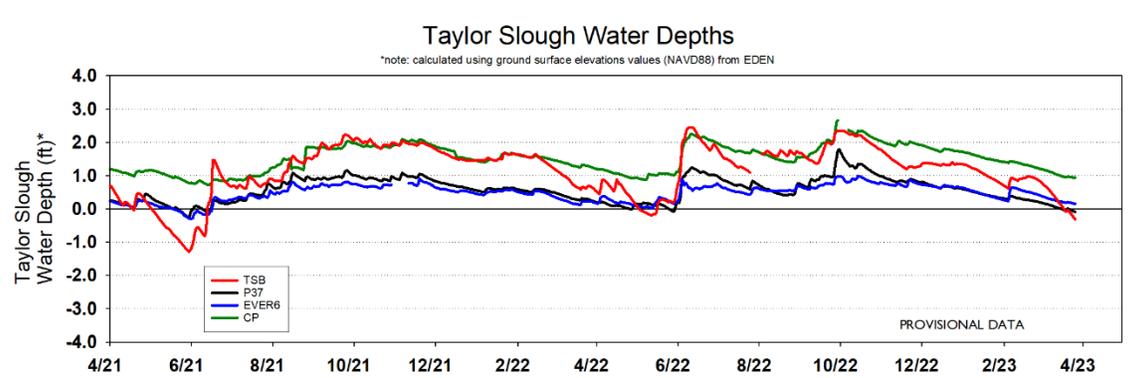


Figure EV-9. Taylor Slough water depth time series.

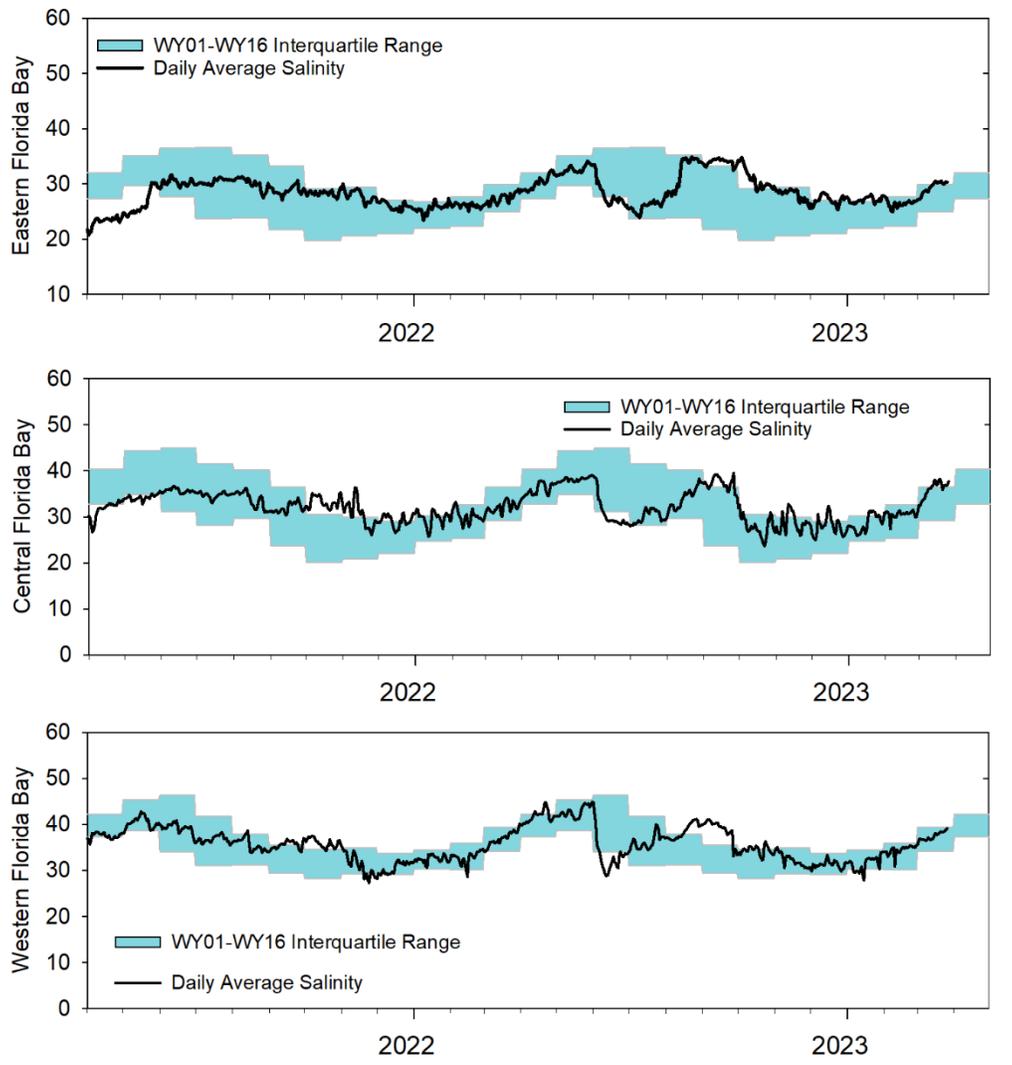


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

Table EV-2. Weekly water depth changes and water management recommendations

SFWMD Everglades Ecological Recommendations, March 28, 2023 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.10'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.10'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season.
WCA-2B	Stage decreased by 0.18'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.12'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season. Lower fire risk and protect peat soils.
WCA-3A NW	Stage decreased by 0.16'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	
Central WCA-3A S	Stage decreased by 0.03'	Conserve water in this basin as possible. Recession rate of less than 0.10' per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.06'		
WCA-3B	Stage decreased by 0.06'	Recession rate of less than 0.10' per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.03'	Make discharges to ENP according to COP and TTF protocol while adaptively considering upstream and downstream ecological conditions. Discussions on water management within the system should be continued.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.23' to -0.01'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from -1.6 to +1.8	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.

Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 252 cfs, and the previous 30-day mean inflow was 235 cfs. The seven-day mean salinity was 32.0 at BBCW8 and 28.3 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

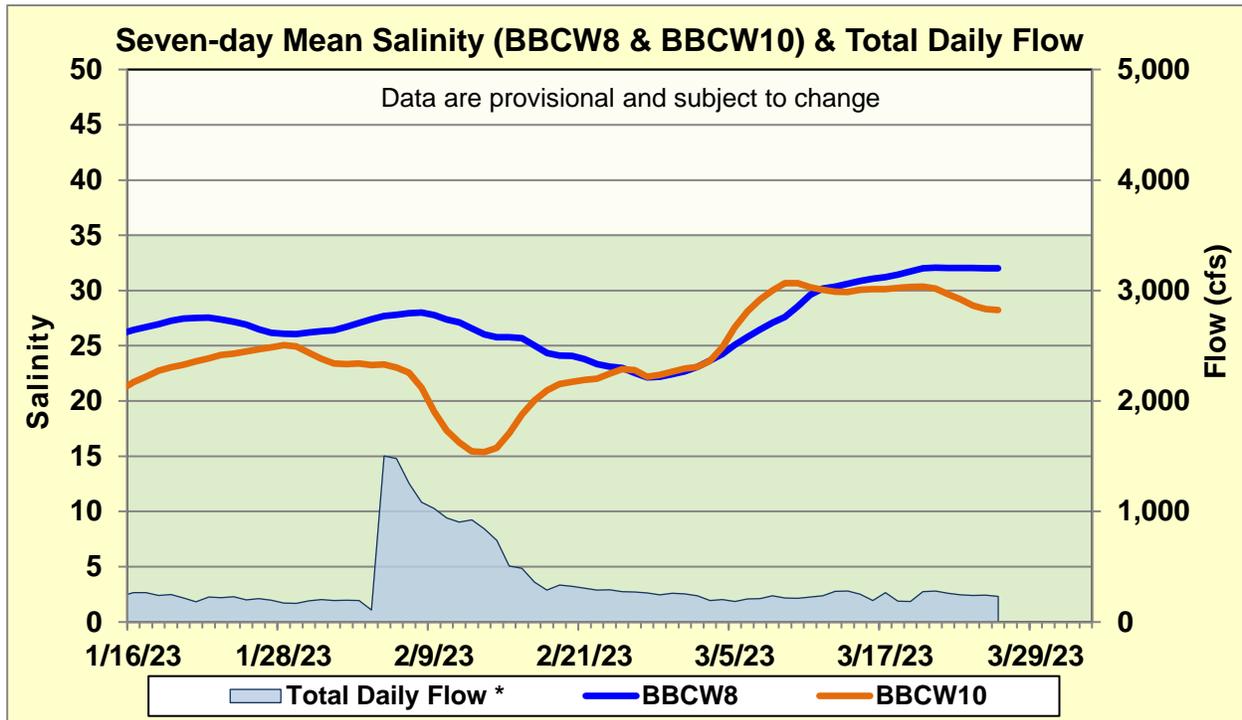


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.